MANUAL ON CONSERVATION AND RESTORATION OF MONUMENTS

Proceedings of an Administrator turned
Conservation Archaeologist cum Museologist

Dr. R. Kannan, Ph.D., I.A.S.

2007
Published by the Government Museum,
Chennai-600 008

MANUAL ON CONSERVATION AND RESTORATION OF MONUMENTS

Proceedings of an Administrator turned Conservation Archaeoiogist cum Museoiogist

Dr. R. Ksnnan
B Com., B.L., M.B.A., C.A.I.I.B.,
M Soc Sci (Birmingham, U.K.), M.A. (History), Ph.D., I.A.S.,
Special Commissioner and Commissioner of Museums,
Government Museum, Chennai - 600 008

New series - General Section - Vol.XVII, No.3, 2007.

Published by
The Special Commissioner and
Commissioner of Museums, Government Museum,
Chennai-600 008

Edition : 2007

No. of Copies : 500

©
The Special Commissioner and Commissioner of Museums,
Government Museum,
Chennai - 600 008.

Price : Rs. 650/-

Printed by : Smart Fonts
(A Unit of Anugraha Educational & Consultancy Services Pvt. Ltd.,)
17/8, 8th East Street, Kamaraj Nagar,
Thiruvanmiyur, Chennai - 600 041.
Phone : 24926712, 42177037
Email : gpvc_2006@yahoo.com

S. RAMAKRISHNAN, IAS, (RETD.),
STATE CHIEF INFORMATION COMMISSIONER

TAMIL NADU INFORMATION COMMISSION,
Krishna Vilas No 89, Dr Alagappa Road,
Purasawakkam, Chennai – 600084
Tele Fax No 26403355

FOREWORD

The five thousand year old Indian culture is not only the oldest living culture in the world, but also it is the only culture that has maintained an organic continuous link with its hoary past. From the pre- Harappan civilisation and perhaps from an even earlier period of cave art to the art, religion and culture of Hindu, Buddhist and Jain periods and the ennobling scriptures like the Vedas, the product of oral tradition, the Tamil songs, the paintings and sculptures earlier in the caves and later in structural monuments is one continuum. The society today still practises many of the traditions described in its literature and depicted in visual form as paintings and sculptures

Looking after the ancient monuments and keeping them in a proper state of repair is the prime duty of every Indian, so that our link to our heritage is not lost due to the neglect of the present generation The Archaeological Survey of India was formed in 1871 AD to preserve our ancient monuments. It really took off after the passing of the Ancient Monuments Preservation Act, 1904 by Lord Curzon, the then Viceroy of India, an ardent imperialist but a great patron of history and culture. Conservation- Archaeology has to adhere to strict UNESCO norms and the Venice Charter.

When I was the Secretary for the Culture Department in 2001 AD, I felt that it would create synergy and make sense, if the Departments of Archaeology and Museums were merged This is the position in many other states like Andhra Pradesh etc Also, the then incumbent of the post of Commissioner of Museums, Dr.R Kannan, Ph D , I A S had acquired considerable technical expertise in his field Therefore, it would have been better if he was also given charge of archaeology, where a lot of work for conservation of monuments had to be done Accordingly, I issued a government order merging the two departments of archaeology and museums in Tamil Nadu for the first time and making Dr Kannan, Ph D , I A S the Commissioner of the combined two departments vide G.O Ms No 238 T.D.C Deaprtment dated 1.10.2001, though he had started working as Commissioner – in – Charge from 1.7.2001 itself

I am happy to note that the decision paid off After 1961, when the State Department of Archaeology was formed, it was only in 2002 that the work of conservation by the department itself

was taken up. This got a fillip due to the grants made available for heritage conservation by the 11th Finance Commission of Government of India.

The work of conservation is highly specialised and technical in nature. It requires knowledge of the traditional Indian Hindu texts on architecture like *Mayamata*, *Manasara* and so on. The methods adopted in modern engineering like use of heavy material, reinforced concrete structures etc should not be adopted unless a rare situation specifically calls for these while conserving heritage structures.

Dr Kannan has done pioneering work by conserving and renovating the Danish Fort at *Tranquebar*, *Manora* Tower at *Pattukottai*, the Giant Granary at *Papanasam* (all in erstwhile undivided *Thanjavur* District), *Siva* Temple at *Sivapuram* near *Sriperumbudur*, the *Tirumalai Naik Mahal*, *Madurai* and many important monuments, which he has covered in this book. The *Vittala* Temple at *Vittalapuram* near *Kalpakkam* just off the East Coast Road is an example of innovation in conservation. This is the first time that Public-Private partnership has been used to make a ruined temple look like a new one without deviating even an inch from conservation norms. It has taken time back to 1521 AD.

He has pioneered the use of power tools in conservation in India. He has personally used them to remove the *Amaravati* sculptures embedded in the walls of the Government Museum, Chennai in 1870 which had started absorbing salinity and moisture due to rise in levels of surrounding areas. This was done in 2001 AD, after a lapse of 130 years, when no one dared to touch them. He has saved them for posterity.

It would be difficult to believe that a person could handle the drought of the century in 2002-2003 as Commissioner of Agriculture and later as Agriculture Production Commissioner cum Secretary, Agriculture and Commissioner of Agriculture with aplomb and simultaneously look after the massive work of renovation and modernisation of the galleries of the Government Museum, Chennai to make it fit for the 151st Anniversary celebrations and the visit of Dr Kalam, the President of India, the Governor of Tamil Nadu and the then Chief Minister, Dr J. Jayalalithaa, while taking up the renovation of about 20 monuments in the archaeology department for the first time. He also wrote many books on Museology and Archaeology in this period, which were released by the President of India on 19. 6. 2003 at the 151st anniversary celebrations. The list of publications written by him is found elsewhere in this book.

He has also done outreach activities in archaeological conservation by writing the archaeological prescription for the *kumbhabhishekam* (a temple ritual of conservation, cleaning performed usually

once in 12 years) of the *Ramaswamy* Temple at *Kumbakonam* under instructions of the then Special Commissioner for Hindu Religious and Charitable Endowments, Thiru M.A Gowri Shankar, I.A.S. and *Sri Naganathaswamy* Temple at *Manambadi* Village, *Kumbakonam* Taluk at the request of the then Collector of *Thanjavur* District, Thiru Kosalram, I.A.S. He has also got prepared an estimate for the famous *Devāsraya Mandapa* at Tiruvarur for a private donor. The latter two have not taken off so far. The *Ramaswamy* Temple is the best conserved among the temples at Kumbakonam for which *kumbhabhishekam* was performed during the penod.

Dr.R.Kannan is a versatile personality who is probably the only person in the last century to have written books on Archaeology, Museums, Agriculture and Cooperation. These are totally unrelated fields. It is difficult to be an expert even in one field for an I.A.S. officer, who gets transferred frequently. But Dr.Kannan has absorbed so much and so fast that he has been able to write books on each subject, not of the indifferent quality one associates with persons who hold out as experts in different fields, but masterpieces, which have been acclaimed as a rich storehouse of knowledge for future generations and scholars. 'He is not a Jack of all trades but master of none, he is master of all trades which he has dealt with'.

He is a person who documents meticulously like the I.C.S. administrators of yester years. This is probably due to his long tenure of more than five years at the Government Museum, Chennai and also in the Department of Archaeology. Despite long years of government service, he has kept his sensitivity as fresh as a youngster and also his enthusiasm tempered with realism and experience alive. He manages to work as an administrator and technical expert inspecting monuments, galleries of museums etc and supervising the archaeological engineering and technical museological work during the day while becoming a scribe in the night burning midnight oil. He claims that the results achieved by the department are due to the Participatory Approach (PRA) methods used by him. As the PRA facilitator, he has led from the front. This approach creates a free synergistic work atmosphere. But since it involves total transparency, it is very difficult to practice in a government scenario. He has toured all parts of the state. The keen eye for detail and a wry English sense of humour characterise his style of writing.

I have had the pleasure of writing forewords for many of the books, which Dr.R.Kannan has written. Since he has been prolific in the number of books he writes, it has also given me a record for the number of forewords written by me, which would easily cross the two dozen mark. This book '*Manual on Conservation and Restoration of Monuments - Proceedings of an Administrator turned Conservation Archaeologist cum Museologist*' shows his expertise in

Archaeology. He has brought a proper mix of old techniques applied with a fresh approach and new approaches like Public- Private partnership. The partnership is without compromise of the principles of Conservation – Archaeology as per UNESCO norms. Public – Private partnership is being talked of now in a big way, but it has been brought to the Department of Archaeology and Museums even in 2002 AD during the tenure of Dr Kannan. He has saved many temples and monuments, which were in imminent danger of collapse. He has taken risks, since many of the roofs etc might have collapsed, though thankfully by the Grace of God and painstakingly planned and thorough application of traditional techniques, there was not even a minor untoward incident.

His technical work and publications have been internationally recognised by his being made an invited Board Member of the Association of International Museums of History at Paris, France, one of the only three from Asia. Dr. Kannan has written several important books and monographs earlier. *His work in conserving and restoring the Government Museum, Chennai has been praised by His Excellency, the President of India, Dr A.P.J Abdul Kalam and also commended internationally.*

As Agriculture Production Commissioner cum Secretary, Agriculture and Commissioner of Agriculture earlier, he has written several books on Agriculture. As Registrar of Cooperative Societies, he has two monumental books to his credit '*Centenary of the Cooperative Movement in Tamil Nadu With Special Reference to the year 2004-05*' and '*Management of Cooperatives in Tamil Nadu With Special Reference to 2005-2006*'. Both are remarkable not only for their scintillating content but also for the rare elegance of get up.

Documentation is second nature to him. He is an academician par – excellence who turns also an administrator, equally adeptly when called upon to do so.

This tenure of his from 14.6.2006 is a rare second tenure in Museums, first as Commissioner of Museums and from 15-11-2006 as Special Commissioner and Commissioner of Museums after getting his grade as Special Commissioner. He has now documented the work done during his previous tenure as Commissioner of Archaeology and Museums.

This book documents the techniques of archaeological conservation that have been kept a hidden mystery all these years, since there has been no documentation of the exact methods like the mix to be used etc. Dr Kannan has demystified it. I am sure this book will be of immense benefit to all those involved in the conservation movement of our ancient heritage, academicians, architects, engineers, archaeologists, museologists, students and historians of the future.

Chennai
29-1-2007

S. Ramakrishnan

(S. RAMAKRISHNAN)

Dr. R. Kannan, Ph.D., I.A.S.,
Special Commissioner and
Commissioner of Museums,
Government Museum,
Egmore, Chennai-600 008

Off +91 44 2819 3778
Fax +91 44 2819 3035
Email govtmuse@md4.vsnl.net.in

PREFACE

India has the oldest culture in the world. It is the only culture that has survived the onslaught of time and is still living. From the Rock Art in the caves which date before even the pre-Harappan civilisation (Mehrgarh – Dilji Kot phase circa 8000 BC) and recently discovered at *Bhirrana*, in Haryana in the Saraswati River area to the highly stylised sculptures, temples and monuments that characterise India even from the early Christian era to the present day is one grand continuum.

The physical evidence of this culture is the archaeological monuments, caves and temples that we see today. Archaeology has mainly three branches, epigraphy, iconography and conservation. Caring for the ancient monuments and keeping them in a proper state of repair is a sacred duty of every Indian. This ensures that we do not cut the umbilical cord with our hoary past. This work falls under Conservation Archaeology mainly dealing with repair and upkeep of ancient monuments, which could be *Stupas*, temples, mausoleums, forts, towers and other secular structures.

The Archaeological Survey of India was formed in 1871 AD to preserve our ancient monuments. The Ancient Monuments Preservation Act, 1904 was the first step in orderly conservation of monuments. It was replaced by the post independence legislation, the Ancient Monuments and Archaeological Sites and Remains Act, 1958 of India. In Tamil Nadu, the State Department of Archaeology was formed in 1961, but a legislation to take over and protect monuments was passed only in 1966 modelled on the central legislation. This act, Tamil Nadu Act (25 of 1966) enabled the state department to take over, conserve and restore monuments.

Conservation is preservation using traditional methods and modern methods like chemical conservation of paintings. It is used where absolutely necessary to preserve the ancient monuments, paintings, manuscripts etc on an as – is – where is basis i.e. the status quo. Restoration is applying the mind of the archaeologist, referring to past records like old photographs, paintings, descriptions in historical documents like travelogues of writers and of course, projecting the mind of the present day archaeologist into the mind of the past sculptor or painter to restore it to its original position. This involves some additions, which are in the nature of filling in of the gaps. However, it is not a

licence to create an entirely new structure or painting as is commonly misunderstood. There is a strict code of conduct for the Conservationist - Archaeologist and Conservation- Archaeology. This is according to UNESCO norms and the Venice Charter, 1964.

Some work had been done during the VIII World Tamil Conference in *Thanjavur* when the Durbar Hall, Arsenal Tower, excavation and conservation of the temple beneath the Arsenal Tower and the conservation of the *Kalyana Mahal* also called (*Sartaj Mahal*) were taken up. This was done by the Archaeological Survey of India. Thiru K.T.Narasimhan was then the Deputy Superintending Archaeologist, Madras Circle in 1993-94. But this was not done by the State Department itself.

The material for this book '*Manual on Conservation and Restoration of Monuments - Proceedings of an Administrator turned Conservation Archaeologist cum Museologist*' was gathered from 1999 onwards when this writer joined the Department of Museums and from 2001, when he was put in charge of Archaeology also. Additional material was gathered during the temporary official disconnect period in Cooperation (mid 2004-mid 2006), when the writer was officially not connected. But all the time, photographs and material was being gathered as a personal hobby. This has borne fruition as this book in 2007. *This work is part of the technical work of the Director/Commissioner of the museum as per the Museum Manual.*

I am happy to have pioneered the use of power tools in conservation in India. I personally operated the drill – cum- chipper used to remove the *Amaravati* sculptures embedded in the walls of the Government Museum, Chennai in 1870. They were placed there by Dr. Bidie and there was a controversy even then between Burgess, the Archaeologist and Dr. Bidie, the Superintendent of the Government Museum. Embedding was to save them from being taken to England. They had started absorbing salinity and moisture due to rise in levels of surrounding areas. They were planned to be removed from 1980 onwards. This was done finally in 2001 AD, after a lapse of 130 years. I am sure that this has saved them for posterity.

I was in poor health soon after an operation in February, 2002. I was unable to wear pants. I used to supervise and climb heights wearing a dhoti not the most convenient of clothes for such work. It was in this mode that I climbed the *Devāsraya Mandap* at *Tiruvarur* and the roof of *Dansborg* (Danish Fort) at *Tranquebar* for its restoration from May 2002 till July, 2002 when the first phase of the latter was completed. The *Ramaswamy* Temple is the best conserved among the temples at *Kumbakonam* for which *kumbhabhishekam* was performed during the period, though there were some deviations in the implementation of my suggestions due to change of personnel.

I have recorded the techniques used in conservation. I must acknowledge the debt of gratitude that I owe to Thiru K.T.Narasimhan, Superintending Archaeologist, Archaeological Survey

of India, Madras Circle who persuaded me to take interest in conservation as soon as I took charge as Commissioner of Archaeology on 1-7-2001. We used to tour together interior areas where no vehicle would go trekking miles through forest.

An important point I noticed is that in no two monuments were the same techniques used though the techniques broadly are the same. It is in the application that fine tuning and differentiation lies. *In this lies the secret of success*. I shall explain this further in the chapter on techniques in this book. Blind replication will lead to disaster as we have all seen. The field of conservation archaeology is a minefield strewn with the careers of many an archaeologist and archaeological engineer. This is true especially in India where inaction is not a problem in public service, but action, which leads to a problem like the collapse of a pillar or roof cries for a scapegoat, a scalp has to be sacrificed. Thankfully, not even a minor incident took place, though the scale of operations was very large to the tune of Rs. 5 Crores nearly.

This book records the conservation of about twenty five monuments and temples that have been conserved. The total number under the State Department of Archaeology is 89. But the monuments and temples in this include the Government Museum, Chennai, the National Art Gallery, Chennai, the *Devāsraya Mandapa, Tiruvarur* and two temples , the *Ramaswamy* Temple, *Kumbakonam* and the *Naganathaswamy* Temple, *Manambadi, Kumbakonam* Taluk, which are not under the State Department of Archaeology. The last three have been done as a labour of love as part of outreach activity.

The work at National Art Gallery, Chennai, the *Devāsraya Mandapa, Tiruvarur* and the *Naganathaswamy* Temple, *Manambadi, Kumbakonam* Taluk have not taken off yet. Some like the *Manora* Tower, the *Dansborg, Tranquebar* and *Tirumalai Naik Mahal* etc were in imminent danger of collapse. Some had already collapsed like the *Vittala* Temple at *Vittalapuram*. The *Dansborg* withstood the 2004 *Tsunami* while the *Masilamani Natha* Temple within a furlong has been nearly washed away. These and many more have all been restored. They will live to see many a decade now.

I have written two books on cooperation during my tenure as Registrar of Cooperative Societies. They are '*Centenary of the Cooperative Movement in Tamil Nadu With Special Reference to the year 2004-05*' and '*Management of Cooperatives in Tamil Nadu With Special Reference to 2005-2006*'.

I had written a book on Agriculture, '*Perambulation* Notes of the Commissioner of Agriculture' to record the activities and new policy initiatives of that department during the period 2002-04, when

I was associated with it as Commissioner of Agriculture and then as Agriculture Production Commissioner and Secretary, Agriculture. Three other books, *'Training in Hi-Tech Agriculture to 1400 Agriculture Graduates'* released by Dr M S Swaminathan, *'WTO - Seminar Proceedings on Agreement on Agriculture - 24-12-2002'*, *'Training Manual on Watershed Management (2003) for NWDPRA'* besides articles like the one on *Eriophyid Mite* published in the book *'Proceedings of the International Seminar on Eriophyid Mite'* organised by the Coconut Council for Asia Pacific in Bangalore in 2003 and one on Coir *'Some thoughts on the Coir Industry'* in the Special Golden Jubilee Souvenir of the Coir Board of India were published. I was in charge of the Department of Museums for five years from 1999 to 2004. I held the merged charge of the Department of Archaeology for nearly two years in two tenures, from 1.7.2001 till 17.10.2002 and from 20.7.2003 till 14.9.2003. Like the old British India hands, I have repeated my usual modus operandi of recording happenings on the model of the British I.C.S. administrators.

The Government Museum, Chennai where I served for more than five years has a record of such publications. These publications have been documented in the Web Site of the Government Museum, Chennai, a site praised by the President of India, Dr A.P.J. Abdul Kalam during the 151st Year celebrations in 2003. The site is rated as one of the best in the world of museums. The recording of activities was revived as the Museum's Journal was published twice a year. Articles written by me were published in the Journal of the Museums Association of India regularly and Proceedings of a Seminar of the International Council of Museums, Paris on Disaster Management, 2003. They also appeared in the Proceedings of the Annual Conferences of the International Association of History Museums. Recently, I have decoded a 17th Century AD manuscript found in the *Mehrangarh Fort, Jodhpur*. It has been published in the National Manuscript Mission Journal as an article on *'Unravelling The Mystery Behind The Diagram In The Form Of Chakras (Sacred Circles) In Mehrangarh Fort, Jodhpur'*. The Museum Journal is being revived now after a gap of two years.

In all my work I use the methodology of the Participatory Approach (Participatory Rural Appraisal – in jargon). Sharing is the characteristic of the PRA Approach as contrasted with hoarding as in the Normal Approach. I have tried to share what I have learned. This book is meant as a 'learning from experience' material for all those involved in the conservation movement of our ancient heritage, academicians, architects, engineers, archaeologists, museologists, students and historians of the future.

The foreword has been written by Thiru S Ramakrishnan, I.A.S. (Retd.), the Chief Information Commissioner of Tamil Nadu. He has written the forewords for many of my books. When the first

ever International Conference held by the Government Museum, Chennai in 2001 was in difficulties he came in unannounced and sat on the last row. This gave a morale boost that went a long way in ensuring its success. When there was praise from the President of India himself for this writer for the work done in the museum on the occasion of the 151st Anniversary, the great man was nowhere to be seen. He was like what Dr Abdul Kalam, the President of India has recorded in *Wings of Fire* of Dr. Brahm Prakash, who was at hand when there were difficulties and receded into the background to allow the subordinate to bask in glory when there was success. We all need role models who inspire.

George Santayana, the great philosopher stated, "When experience is not retained as among savages, infancy is perpetual. Those who cannot remember the past are condemned to repeat it". This is how history repeats itself. This is truer of India than any other country as our history shows. It is also said that much of Indian history is undocumented or very poorly documented, so much so that Indians are supposed to have very poor historical sense. This publication is aimed at averting such criticism and problems for future generations.

I hope that this publication, which contains a lot of technical details will be of use to the conservation movement of our ancient heritage, academicians, architects, engineers, archaeologists, museologists, students and historians of the future.

16-1-2007

Dr. R. Kannan, Ph.D., I.A.S.)

To

The memory of late Sri T.S.Padmanabha Iyer (Retd), Superintending Engineer (P.W.D) British India & Composite Madras State, my grandfather on his centenary (1901-2001) and my uncle late Sri P.Subramani n Also to Ms Lalitha, my mother, Mrs Seetha, my wife, Mr Sridar Padmanabhan Kannan, my son and Ms. Shrikalaa, my daughter for their encouragement and help

Dr. R. Kannan, Ph.D., I.A.S.

ACKNOWLEDGEMENTS

I gratefully acknowledge the kind permission given by the Dr Sitharam Gurumurthy, Ph.D., I.A.S., the Principal Commissioner of Archaeology, Government of Tamil Nadu to use the information in the Monument Accession Register, photographs and other information available with the State Department of Archaeology, without which this book would not have been possible

The help of some of the officers of the departments of Archaeology and Museums has to be acknowledged They have done the actual work of culling out the information from records like the Monument Register The names are Thiru N.Sundararjan, Curator (Education), Thiru R. Narayanan, Engineer, State Department of Archaeology, Thiru M.T.Sridharan, Photographer, State Department of Archaeology, Thiru Ramesh, Photographer, Government Museum, Chennai and Tmt. Thara, Steno-Typist.

LIST OF PUBLICATIONS WRITTEN BY THE AUTHOR, DR.R. KANNAN, Ph.D., I.A.S.

1) Monograph - A holistic approach to dating in Ancient History especially Indian History (2000)
2) Participatory Rural Appraisal in Action (The impact on Rural Women of PRA and Participatory Approaches in a Government Run Rural Development Programme) (2001)
3) Documentation on the Cannons in the Government Museum, Chennai (2000)
4) Iconography of Jain Images in the Government Museum, Chennai (2001) Vol I along with the late Thiru K Lakshminarayanan, Retd Assistant Director, a great scholar who did the research work
5) Manual on the Numismatic Gallery in the Government, Chennai (2003)
6) Monograph on the Rock and Cave Art Gallery in the Government Museum, Chennai (2003)
7) A Manual on the Holographic Gallery in the Government Museum, Chennai (2003)
8) Manual for Disaster Management in Museums - R Kannan (2001)
9) Documentation of the text of Son-et-lumiere on the Rock and Cave Art Galley (2002) in English and Tamil (2 books)
10) Documentation of the text on the Video clips on the touch screen on the Rock and Cave Art Gallery (2002)
11) Souvenir published for the 151st Anniversary Celebrations (2003)
12) Manual on the Bronzes in the Government Museum, Chennai (2003)
13) Iconography of Jain Images in the districts of Tamil Nadu (covering the Museums of the Department of Archaeology and Museums and even on roads) 2002 - Volume II along with the late Thiru K Lakshminarayanan, Retd Assistant Director, a great scholar who did the research work
14) Guide to the Exposition on the Progress of Industries and Handicrafts of Tamil Nadu in the Government Museum, Chennai (2004) along with the late Thiru K Lakshminarayanan, Retd. Assistant Director
15) Proceedings of the National Seminar on Present Trends in Museology (2004) – General Editor
16) Proceedings of the Seminar on Our Role in Protecting Cultural Heritage (1999)
17) Perambulation Notes of the Commissioner of Agriculture (2002-2004)

18) WTO - Seminar Proceedings on Agreement on Agriculture (2003)

19) Training Manual on Watershed Management (2003)

20) Hi-Tech Training to 1400 Technocrats of Agriculture, Horticulture, Agricultural Marketing Departments – Training Guide (2003-2004)

21) Edited several issues of the Journal of the Government Museum, Chennai and wrote articles also

22) Centenary of the Cooperative Movement in Tamil Nadu with special reference to the year (2004-05)

23) Management of Cooperatives in Tamil Nadu With Special Reference to 2005-2006

24) Unravelling the Mystery Behind the Diagram in the Form of *Chakras* (Sacred Circles) in Mehrangarh Fort, Jodhpur – Festschrift Volume of Dr K.V.Raman, the eminent archaeologist (forthcoming)

Brochures

1. Rock and Cave Art Gallery
2. Botany Gallery
3. Bronze Gallery
4. Brochure "Exposition on the progress of Industries and Handicrafts of Tamil Nadu", Government Museum, Chennai
5. Government Museum, Chennai – General Brochure
6. Paintings in the National Art Gallery and the Contemporary Art Gallery of the Government Museum, Chennai
7. Chemical Conservation and Research Laboratory
8. Children's Museum

Videos

1. Bronze making
2. The Museum through the ages (from the 1950s till the present)
3. Retrieving from the Archives the movie on the museum produced in 1971, converting it into CD and submitting it in English

4 Rock and Cave Art

5 Video on the museum in general (present)

6 History of Industry and Handicrafts in Tamil Nadu.

Articles

1 Article on the coir industry in the Golden Jubilee Souvenir of the Coir Board

2 Article on Disaster Management in Museums in the 'Proceedings of the Seminar on Disaster Management in Museums, International Council for Museums, 2003', Paris

3 Several articles in the Annual Journals of the Museums Association of India

4 Several articles in several issues of the Journal of the Government Museum, Chennai

5 Several articles on Participatory Rural Appraisal in Training Manuals published by the Department of Agriculture and Tamil Nadu Agriculture University.

Table of Contents

I	An Introduction to the Proceedings of an Administrator turned Conservation Archaeologist cum Museologist	1
II	Summary of the Details of the Monuments as gathered from the Accession Register maintained by the State Department of Archaeology and other Sources	9
III	Techniques of Conservation	79
IV	Practical Application of Conservation and Restoration Techniques	93
V	Inspection Notes and Archaeological Prescriptions	99
VI	History of the Heritage Buildings Housing the Government Museum, Chennai	199
VII	Conservation of the Heritage Buildings in the Government Museum, Chennai	201
VIII	*Devāsraya Mandapa Thiruvarur* – Estimate for Conservation and Restoration	231
IX	Conservation of the Sculptures of the *Amarāvati* Gallery	255
X	Seminar Paper on the use of Power Tools in Conservation (2001)	261
XI	Sand-blasting	267
XII	*Porto Novo* – Development for Heritage Tourism	269
XIII	Conclusion	285
XIV	Bibliography	289
XV	Site Maps and Plans of the Structures	293

Fortynine Colour plates of the photographs are interleaved between text pages

(Contd.)

Colour Plates

		Page No
I and II	*Chandraprabha* Jain Temple - *Kanchipuram*	31 and 33
II and III	*Vardhamāna* Jain Temple (*Trailokyanātha*) - *Kanchipuram*	33 and 35
IV	*Chinnaiyan Kulam* - *Tiruvannamalai*	37
V - VII	*Manora* Tower - *Thanjavur* District	39 - 43
VIII	*Masilamaninathar* Temple - *Tranquebar*	45
IX - XIV	*Dansborg* Fort - *Tranquebar*	63 - 73
XV and XVI	*Ramalinga Vilasam* - *Ramanathapuram*	75 and 77
XVII	*Swastik* Tank - *Tiruvellarai*	111
XVIII - XX	*Thanjavur* Palace - *Thanjavur* District	113 - 117
XXI - XXIV	*Tirumalai Naik Mahal* (Palace) - *Madurai*	119 - 125
XXV	*Tirmalai Naik Mandapam*, *Alagarkoil* - *Madurai*	143
XXVI and XXVII	*Tirupalaithurai* Giant Granary - *Papanasam*	145 and 147
XXVIII and XXIX	*Siva* Temple, *Sivapuram*	149 and 151
XXX and XXXI	*De-Lanoy's* Tomb at *Udayagiri* Fort	153 and 155
XXXII	*Udayagiri* Fort	157
XXXIII - XXXVIII	*Vittala* Temple - *Vittalapuram*	175 - 185
XXXIX and XL	*Rock Art*	187 and 189
XLI - XLV	Government Museum - Chennai	207 - 215
XLVI	*Amaravati* Gallery	217
XLVII and XLVIII	Sand Blasting	219 and 221
XLIX	*Porto Novo*	271

CHAPTER I

AN INTRODUCTION TO THE PROCEEDINGS OF AN ADMINISTRATOR TURNED CONSERVATION ARCHAEOLOGIST CUM MUSEOLOGIST

The story of the past of human beings can be deciphered in the historical era if the script in which they wrote their accounts of contemporary events can be deciphered and the language of their contents understood. This is the case in the historical period, where epigraphy studies inscriptions on stone or metal that has been discovered. Prof. K.V.Raman with whom this writer is closely associated, states that 'Archaeology is the discipline that studies the story of man's past through his material remains' (Raman, K.V, 1986). Therefore, wherever there are material remains as in the case of the Indus Valley civilisation (*Sindhu-Saraswati*), the past can be reconstructed and conjectured up to a certain point. These material remains are excavated by going below the present surface as time causes soil to be deposited on the past layers of civilisation, where they lie undisturbed waiting to be discovered by the persons curious enough to probe. But in the period when structures are discovered they have to be carefully preserved as the archaeologist first found them. This is where Archaeology has made a lot of progress since the time of the 19th Century AD archaeologists like Heinrich Schliemann (1822-1890) and others who not only disturbed the sites but also did not conserve them. Their methods have been replaced by modern methods of conservation of monuments. Any structure more than 100 years old is considered as a heritage structure according to the Ancient Monuments and Archaeological Sites and Remains Act, 1958 of India. They are protected by the Archaeological Survey of India if it has taken them over.

As Commissioner of Museums and then of Archaeology, this writer had the rare opportunity of interacting with field archaeologists like Prof. K.V.Raman, Thiru K.T.Narasimhan, Dr.Abdul Majeed, Dr. Shanti Pappu and other colleagues in both the departments of Museums and Archaeology whose names would be too numerous to mention but who specialised in various branches of Archaeology like Epigraphy, Excavation both historic and pre-historic and conservation and did yeoman service. It was a pioneering attempt to conserve monuments with the help of the XI Finance Commission grant for monuments, which had been taken under protection from circa 1970 AD. Concurrently, a massive conservation and restoration of the heritage buildings and reorganisation of the galleries of the Government Museums took place in 2001-2003 AD and continued beyond that period also. This was an exciting time to be working in. This writer felt that in India documentation is usually neglected resulting in the lessons of history being forgotten.

'Those who neglect the lessons of history are condemned to repeat it', said George Santayana Two excavations were carried out at *Mangadu* near *Rajapalayam* and *Perur* on the *Noyyal* River bank near *Coimbatore*. These have been documented (Shetty, Ashok Vardhan, 2003). The British administrators were great documentors also. Therefore, this attempt is to document the conservation aspects of the nearly more than twenty five monuments and temples that this writer was involved with. This will ensure that the experiences are available for posterity to learn and to improve

Archaeology, History and Culture

The study of the human past is the subject matter of both Archaeology and History. But history is dependent on written records and therefore, as seen above it is limited to that part of the human past for which there are written documents. Archaeology can visualise the ancient past even the pre-historic period. History deals even with the software part of culture for which there is no material evidence, while archaeology pays attention to the hardware part i.e. the material aspects of culture.

Archaeology

Archaeology studies the story of man's past through his material remains.

Kinds of Archaeology

There are several branches of Archaeology like Economic Archaeology, Under-Water Archaeology, Excavation Archaeology, Epigraphy and Conservation Archaeology.

Conservation

The concept of conservation was not initially differentiated from restoration. In India, the first step towards conservation was taken in 1871AD when the Archaeological Survey of India (ASI) was formed. The first legal sanction came during the tenure of Lord Curzon, the imperialist Viceroy of India, who nevertheless had a keen sense of history. He enacted the Ancient Monument Preservation Act in 1904. This was replaced after independence by the Ancient Monuments and Archaeological Sites and Remains Act, 1958 of India. In Tamil Nadu, an act with the name Tamil Nadu Ancient and Historical Monuments and Archaeological Sites and Remains Act was enacted in 1966 (Act 25/ 1966), which enabled the State Department of Archaeology that had been formed in 1961 to take some Tier II important monuments, which had not been taken under the protection by the ASI under its protection G.O. Ms. No. 57 T.D.C. & R.E. Department dated 21-4-2003, under Sub- Rule (2) of Rule 32 of the Tamil Nadu Ancient and Historical Monuments and Archaeological Sites and

Remains Rules, 1971 declared the area up to 100 metres from a protected monument as prohibited area and a further 200 metres beyond it as regulated area on the Government of India pattern

However, the State Department did not do any conservation by itself. In 1993-1994, during the VIII World Tamil Conference some important monuments were conserved at *Thonjavur* by the ASI as a Deposit Work on behalf of the State Government of Tamil Nadu. On 1-7- 2001, when this writer took charge as Commissioner of Archaeology and Museums in combined charge for the first time in the state (the departments were separated again in October, 2002), there was a large grant of nearly Rs 10 Crores made available by the XI Finance Commission for heritage protection. Rs 5 Crores was earmarked for the State Department of Archaeology and the balance of Rs 5 Crores to the Department of Museums for conservation of the heritage museum buildings and galleries. This was the first attempt at conservation by the State Department of Archaeology by itself. However, the execution of works was left to the Public Works Department since it was felt that they were best suited to Tendering on such a large scale. A technical consultant for periodic supervision to ensure that the work stuck to the Archaeological Prescription for conservation given by the Commissioner (the writer) was adhered to was appointed. This was a path breaking new experiment. A Public – Private partnership was also set up during the period to renovate the *Vittala* Temple at *Vittalapuram* as per conservation norms in 2002. A Memorandum of Understanding with the donor was entered into after obtaining government approval. It must be noted that the Tamil Nadu Act 25/ 1966 has a provision for such an arrangement. This was a bold new initiative at that time. It has now become standard government policy since.

Why is Conservation so Specialised?

The Venice Charter for the Conservation and Restoration of Monuments and Sites is a treaty that gives an international framework for the preservation and restoration of ancient buildings. The following text is the original 1964 text agreed between the signatory nations, which gives the main features for conservation and restoration. Any departure from these norms is unacceptable.

Conservation

ARTICLE 3. The intention in conserving and restoring monuments is to safeguard them no less as works of art than as historical evidence.

Restoration

ARTICLE 9. The process of restoration is a highly specialized operation. Its aim is to preserve and reveal the aesthetic and historic value of the monument and is based on respect for

original material and authentic documents. It must stop at the point where conjecture begins, and in this case moreover any extra work, which is indispensable, must be distinct from the architectural composition and must bear a contemporary stamp. The restoration in any case must be preceded and followed by an archaeological and historical study of the monument.

ARTICLE 10. Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modern technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience.'

Monument

"Ancient Monument" means any structure, erection or monument or any tumulus or any cave or sculpture or inscription or monolith, which is having archaeological, historical value of artistic interest or any remains thereof, and it includes

1. The site of an ancient monument
2. Portion of land adjoining the site of an ancient monument as may be required for fencing or covering in or otherwise preserving such monument and
3. The means of access to and convenient inspection of an ancient monument.

The above is what makes the work of conservation and restoration so specialised. Ofcourse, in many of our temples, the *Kumbhabishekam* (a temple ritual of conservation, cleaning performed usually once in 12 years) is done without guidance from any archaeologist resulting sometimes in obliteration of the stylistic features, which help us to identify the original builder of the structure. Another problem encountered is the resort to dangerous practices like sand blasting in the mistaken belief that it cleans the granite walls and sculptures. Inscriptions are lost.

There is also the lack of public awareness of the importance of preserving our precious ancient heritage of more than 5000 years. This results in vandalism, graffiti and lack of cleanliness in our ancient monuments.

In this book, this writer has narrated the general principles of conservation and restoration practised in India (ASI), which is also adopted by the State Department of Archaeology. The techniques of conservation and restoration are general, they can be called a science. But their specific application to a particular monument or temple is an art. This is much like what the management gurus state of the subject of management. The book narrates these specific applications, giving the reasons as far as possible. Reference to ancient texts like *Mayamata, Manasara* and *Samarangana Sutradhara* are made where ever necessary. This is because all the monuments including

most of those built after the advent of the Europeans especially the British buildings of the XIX Century AD adopted Indo-Saracenic architecture after Robert Chisholm, the British Architect. They have been based on ancient Hindu Indian architecture principles. *Any attempt at repair or conservation or restoration without knowledge of ancient texts will be a failure*

The conservation or restoration owed chiefly due to the enthusiasm of the then Secretary for Tamil Development and Culture (please refer Preface), who wanted to restore the monuments. Many of the monuments were in a crumbling state after centuries of neglect. Some had been vandalised. Some others had been repaired using wrong methods like use of modern Reinforced Concrete members (RCC), thinking that this was stronger than the ancient technique. They failed to note that the older materials were lighter and had withstood the ravages of time for more than a thousand years in most cases. As Thiru Narasimhan often used to say, they loaded an old man with a huge load to carry. The result would be the crumbling of the entire edifice. A case in point is the *Manora*, a Tower, which has been narrated in detail. If there had been delay, the tower would have fallen, at least the top storeys, where RCC beams had been introduced. Thiru K.T. Narasimhan, the then Superintending Archaeologist of the ASI, Madras Circle who has conserved and restored many monuments was actively involved as narrated in the preface with this writer. He took the lead for a couple of monuments and then the writer took over, since it was an application of principles learnt for new areas. Thiru Narasimhan is an expert in the ancient Sanskrit Vastu texts like *Mayamata*. The writer referred to translations where necessary before issuing the Archaeological Prescription. But application is an art learnt by God's grace, which makes one realise the appropriate technique for the monument at the appropriate time.

It is not that there is a blind adherence to ancient practice only to the total exclusion of modern methods and technologies. Where appropriate modern methods have been used without any reservation. A case in point is the removal of the priceless *Amaravati* sculptures embedded in the walls of the Government Museum, Chennai after 130 years using Power Tools for the first time in India in 2001-2002. There are similar instances narrated elsewhere through out the book. The technical expert who assisted was Thiru M.G. Chella Pillai, retired Archaeological engineer of the ASI, Chennai Circle hired on the recommendation of Thiru K.T.Narasimhan. The engineers of the State Department of Archaeology also took a keen interest and helped. The work was risky since it was being undertaken for the first time.

In every monument different techniques were used though the techniques broadly are the same. It is in the application that fine-tuning lies. *In this lies the secret of success.* I shall explain this further in the chapter on techniques in this book. Blind replication will lead to disaster-collapse.

of the structure or other heavy damage Many a career in conservation archaeology has been ruined due to even an isolated failure This is true especially in India where inaction does not create problems despite the teachings of the *Bhagavad Gita* which deprecates attachment to inaction, especially in public service, it is action, which leads to a problem, say like the collapse of a pillar or roof

Outreach Activity

The work also included as part of the Outreach Activity giving the Archaeological Prescription for temples under the control of the Hindu Religious and Charitable Endowments Department at the request of the then enlightened Special Commissioner, Thiru M.A Gowri Shankar, I A S, and the then Collector of *Thanjavur*, Thiru Kosalram, I A S It even involved the writer climbing the roof (dhoti clad) and other heights of the *Devāsraya Mandapa* at *Tiruvarur* Temple soon after an operation, which prevented the wearing of pants, when a private donor expressed interest to conserve and restore it The writer inspected *Porto Novo* and gave the notes of inspection for making it a heritage theme park in his second tenure as Special Commissioner and Commissioner of Museums on 26-10-2006 at the request of the Collector of *Cuddalore*, Thiru Gagandeep Singh Bedi, I.A S , based on orders issued by Thiru Iraianbu, I A S , Secretary, Tourism Department

In all my work, I use the methodology of the Participatory Approach (Participatory Rural Appraisal – in jargon) Sharing is the characteristic of the PRA Approach as contrasted with hoarding as in the Normal Approach I have tried to share what others and I have learned so that the wheel need not be reinvented This will be very useful in the future when the same monuments or similar monuments are taken up for conservation may be in the near future or even a century later

Structure of the Book

In this book, the general principles of conservation and their application are narrated Interesting details of each of the monuments, temples and structures, their history etc have been adumbrated in Chapter II These have been gleaned from the Accession Register maintained by the State Department of Archaeology and other sources like the records and publications of the Government Museum, Chennai and others The theory with practical examples of the techniques of conservation are described in Chapter III as Techniques of Conservation In Chapter –IV, the Practical Application of Conservation and Restoration, techniques with numerous examples comparing experiences in India and even abroad is narrated Chapter – V gives the Archaeological Prescriptions for the monuments and temples conserved and restored These are those protected by the State

Department of Archaeology and others not in the protected list. In Chapter – VI, the history of the heritage buildings housing the Government Museum and their construction have been provided. In Chapter- VII Conservation of Heritage Buildings in the Government Museum, Chennai, the *modus operandi* of conservation with regard to the museum buildings at Chennai is related. In Chapter – VIII, detailed estimates for conservation of the *Devāsraya Mandapa* at *Tiruvarur* prepared as Outreach Activity are given. This information is seldom parted with. But this writer has given it for the benefit of future generations of historians and archaeologists. Chapter IX deals with Conservation of the sculptures of the *Amaravati* gallery. From Chapter – X onwards, interconnected topics are dealt with. 'Seminar Paper on the Use of Power Tools in Conservation 2001' deals with the work done in the Government Museum, Chennai by the use of power tools for removal of the priceless *Amaravati* sculptures embedded in the walls of the Government Museum, Chennai. In Chapter- XI, the evils of sandblasting and alternative methods to sandblasting are listed, since anybody can easily criticise but there has to be a remedy also for the problems. In Chapter- XII, notes of inspection with a background note on the history of the monuments at *Porto Novo* are provided. This is under Outreach Activity for tourism development along with heritage conservation. A lot of visual material in the form of photographs and plans of the state of the monuments before conservation and restoration, visual presentation of the methods adopted during various stages of conservation and the final result as the 'After' are presented. Since seeing is believing, the effect of the 'Before-After' is usually what impresses audiences most whenever this writer delivered lectures even to erudite audiences like at the University of Madras or *fora* of scientists. The book concludes with a summary, the lessons learnt and speculation for the future as Chapter XIII and Bibiliography as Chapter XIV. Chapter XV contains site maps and plans of the structures.

CHAPTER II

SUMMARY OF THE DETAILS OF THE MONUMENTS AS GATHERED FROM THE ACCESSION REGISTER MAINTAINED BY THE STATE DEPARTMENT OF ARCHAEOLOGY AND OTHER SOURCES

(Reproduced under permission of the Principal Commissioner, State Department of Archaeology)

1. Name of the monument : *Chandraprabha* Temple

Serial No	13
District	*Kanchipuram*
Taluk	*Kanchipuram*
Village No	127
Name of the Village	*Tiruparuthikundram*
Location of the monument	75 kilometres from Chennai and part of Kanchipuram Town
Land Survey No.	169/1,
Area in Hectare	3.69
Present Owner	Department of Archaeology East 169/1 part-Government Village land South 109/1 *Trilokyanātha Jeenaswami* Temple West 169/1-Part- Government Village land North 169/1 -Part- Government Village land
Monument Declared Date	09.09.1988
Period	8th Century AD

COLOUR PLATE PAGE NO 31 AND 33

Further Information

Thiru T.N. Ramachandran has written a book on *Tiruparuttikuṉram* and its temples under the title – Bulletin of the Madras Government Museum – Edited by the Superintendent – *'Tiruparuttikuṉram and its temples with appendices on Jaina units of measurement and time cosmology and classification of souls* – New Series – General Section Vol. I, Pt.3 – first published in 1934 and reprinted in 2002. The book gives a fund of information on all aspects of the two temples *Chandraprabha* and *Vardhamāna*. I give below the culled out information germane to our subject - conservation and restoration from the book.

Tiruparuttikuṉram is the greatest Jain centre in Tamil Nadu. It proves that Jainism once thrived in *Kanchipuram*. This place might have existed even before the *Pallava* period. However,

the architectural features of the structure are similar to that of the 8th Century AD Hindu temples. The main deity is *Chandraprabha Swami*, the Eighth *Tīrthankara*, which is of stucco as in the temples of the earliest period i.e. before 7th Century AD (For further details on *Tīrthankaras*, Please refer Kannan, Dr., R., 2001 and 2002 of Jain Images, Volumes I and II).

This *Chandraprabha* temple is located to the North of the big temple (*Trailokyanātha Jeenaswami* temple) of Jaina Kanchi also called *Tiruparuttikuṇram*. It faces East. It is located on the North bank of the river *Vegavati*. The *Vimana* is about 12 feet high. The temple is called "*Darvana stalam*" (*Ervāṇa Sthalam* – the accession Register has a misspelt word) or *Malaiyanar* koil. The temple consists of a sanctum, *Antarāla* (*Ardha-maṇḍapa*, a passage that connects the *Mahā-maṇḍapa* in the front with the *Garbha – Griha* or sanctum-sanctorum) and a small *Maha-maṇḍapa*. The *Vimāna* on the top of the sanctum is constructed of brick. A granite *maṇḍapa* in front of the *Maha-maṇḍapa* is a later addition.

The Temples

'The two temples at *Tiruparuttikuṇram* are among the oldest temples of the then Chingelput district. The older of the two is a small shrine dedicated to *Chandraprabha*, the eighth *Tirthankara*. The other, which is later, is larger, being in fact the largest Jaina temple in the Conjeevaram Taluk. It is dedicated to *Vardhamāna*, the twenty-fourth *Tīrthankara* popularly known as *Mahāvīra* and locally as *Trailokyanātha*. The history of these temples is clearly recorded in the style of architecture and in the inscriptions found in them. It is for this reason, and on account of a series of paintings in the larger of them, that they are especially interesting. Local tradition says that they owe their existence to a *Pallava* king and that he built them at the instance of two Jaina teachers, who lived in the village. The first of the tradition is in accordance with the style of architecture of the earlier of the two, but the second part does not agree with inscriptions in the later temple which show that the two teachers mentioned were not contemporaneous with the *Pallavas*, but flourished some six centuries after them, i.e., in the 14th century' (Ramachandran, T.N. (1934) 2002, p.10).

The *Chandraprabha* Temple (See - Plate I (plan), page no. 15, fig. A, Colour Plate I, fig. 1, page no. 31)

The small temple dedicated to *Chandraprabha* lies to the north of the larger temple and is situated in one corner of a garden attached to it. The entrance, which faces east, leads into a narrow transverse passage bounded on the opposite side by a wall. Two *Pallava* pilasters (see - Plate I-B 2, page no. 15) flank the entrance, one on either side of it, with their inner sides (i.e.) the sides facing the entrance) flat. The lintels over them form part of a row of sunken bands placed at equal intervals, giving thereby no room for the assumption that the entrance was built in the wall later than

the time of the wall itself. Thus the entrance made on the wall is as originally designed. The wall on the inner side of the passage is 10'1½"x 8' with the corbels of the pilasters at either end flat as in the case of the pilasters flanking the entrance. The northern end of the passage is occupied by a flight of steps. These steps have been clearly inserted after the temple was built. The inner wall bears six pilasters of the *Pallava* type as found on the outer walls of the temple (see Plate I-B.2, page no. 15).

A passage about the width of the opening now occupied by the stairs, 2'9", must have gone round the inner shrine as in the *Vaikunthanātha Perumāl* temple at Conjeevaram (spelt Kanchipuram now). The *Vaikuṇthanātha* temple, being larger, has this passage 3' in width. The blocking of the southern end of the transverse passage has been done irregularly, the joints becoming apparent on examination. The inner wall has been so very thickly plastered with undressed *chunam* (limestone mortar) above the pilasters that any ornamentation it may have had here is no longer visible. Over it are placed granite beams irregularly, suggesting a later age for the superstructure. The plinth of this inner wall shows two mouldings with a sunken band between them as in the *Kailāsanātha*, *Vaikuṇṭhanātha*, *Matangeśvara* and *Mukteśvara* temples of *Conjeevaram.* (Ramachandran, T.N (1934) 2002, pp.10-11)

This would lead one to assume that the whole temple was planned on the model of a *Vishnu* or *Śiva* temple, with the sanctuary and the small shrine for *Garuda* or *Nandi*, the *vāhanas* of *Vishnu* or *Siva* facing it. The temple under discussion is at present Jaina and we know of no Hindu temples later converted into Jaina ones. Neither, however, do we know any Jaina temple with two shrines, one for the main god, say a *Tīrthankara*, and the other for some attendant god of his like, a *Yaksha*. Therefore, if the present temple did contain two shrines and originated as a Jaina one, it was probably designed in imitation of say, a *Śiva* temple consisting of the *Śiva* shrine and the *Nandī* shrine, the latter facing the former. There is, however, also the possibility that the inner wall of the transverse entrance passage was not the back of a subsidiary shrine, but just a simple screen. In either case the main shrine would have served as the basis on which the present *garbhagrtha* of the *Chandraprabha* shrine above has arisen, when it was closed.

The steps at the right hand end of the transverse passage lead to an upper floor where the present *Chandraprabha* shrine is situated. It is built at a height of about 12 feet from the ground. It is said to-day that such a construction was necessitated, owing to the fact that cotton cultivation was once extensively carried on here, from which the village came to be called "*(Tiru)paruttikunram*" or "the hill of cotton" and that the image had to be placed on the second floor in order that it might not be hidden. The Jainas of the locality call this temple by such names as "*Ērvāṇa-sthalam*," and "*Malayanar-kōyil*," names, which are associated with this temple probably because of its elevation.

The upper floor (see - Colour Plate 1, fig 1, page no 31) consists of the sanctuary (*garbhagṛiha)* with the usual *antarāla* attached to it in front, a small *maṇḍapa* (this is probably intended to answer the *ardha-maṇḍapa*) in front of the *antarāla,* and the narrow processional path already alluded to, which goes round the shrine A *vimāna* of brick and mortar, has been put up over the sanctuary, the workmanship of which is clearly recent

While both the *garbhagṛiha* and the *antarāla* are of brick, the ceiling of the latter is of granite and sandstone slabs, combined irregularly, the latter probably removed from the old structure These are arranged one above the other in the form of an octagon The *Ardha maṇḍapa* in front of the *antarāla* to which the steps from below lead, has two pillars standing on a modern brick flooring and supporting an equally modern *chunam* ceiling

The sanctuary contains a big image (now coloured) of *Chandraprabha,* of *stucco,* repaired some thirty years ago, which is the principal image, and two other smaller images, one of *Kunthunātha,* the seventeenth *Tirthankara,* made of white marble, and the other of *Vardhamāna* made of granite All the three are seated in the *paryanka* attitude, i e , with the legs crossed and the palms placed one over the other on the lap Two *Devas,* also of *stucco,* with *chāmara* in hand, stand behind, one on either side of the *Chandraprabha* image and like the latter are coloured over. The history of the *Chandraprabha* image seems to be unknown The images of *Kunthunātha and Vardhamāna* are recent additions, that of the former being a present made by Mr Bapu Jain of Perambur, near Madras. The image of *Vardhamāna* was bought in 1922 from Mr Bhujanga Rao of *Conjeevaram* by the temple authorities who considered its acquisition for their temple as a work of deep merit About 15 years ago, this image was found as treasure trove under an old coconut tree blown down by a strong wind in the vicinity of the *Kāmākshī Amman* temple in *Conjeevaram* The image is in a good state of preservation and represents *Vardhamāna* in the *paryanka-āsana,* with the *bhāmaṇḍala* or the halo over his head in the form of a semi-circle Service has been conducted in this temple only since the arrival of this image On the pedestal of the other image, which as we have said represents *Kunthunātha* , the seventeenth *Tīrthankara,* are incised the following letters in modern *Grantha* script -

"*Kunthunāthāya namah*" meaning "Salutation to *Kunthunātha* "

In the *garbhagṛiha,* on its two sidewalls, some modern paintings, recently white-washed over, show six *Devis* or attendant goddesses of half life-size, three on each side All the six are standing, with conical crowns (*kirīṭa)* on their heads, and are turning towards the god whom they have come to worship The first, on the northern wall (i e , the one farther away from the god) holds

in both her hands a tray (*tāmbāḷam),* the second a garland with a lotus at each end, and the third (i.e., the one nearer the god) a similar garland in her right hand while her left hangs down. The three on the southern wall are engaged as follows: the first (i.e. the one farther away from the god) holds in both her hands a tray (*tāmbāḷam),* the second a garland in her left hand while her right hangs down, and the third (the one nearer the god) with both hands holding something not clear, but probably a garland.

Attempts were made to find out what lay inside the lower shrine by doing trial digging from above, i.e., from the upper shrine and from the *antarāla,* but only sandy mud was revealed as far as the eye could see or the crowbar could reach. It is evident that the lower room is completely filled with this sand.

The temple itself shows certain architectural details that place it among the temples that are said to have been built by the later *Pallava* kings beginning with *Narasimhavarman* II alias *Rājasimha.* Dr. Jouveau Dubreuil, while speaking of the later *Pallava* antiquities, divides them into two (1) Those without inscriptions and (2) Those with inscriptions'. He mentions this temple among the former and assigns it on grounds of architectural details to a period ranging from 720-900 AD. He does not appear to be right in classifying this temple under those without inscriptions, for there are inscriptions all along its lower plinth and the base. Unfortunately, the temple was built with the same kind of sandstone with which the *Kailasanātha* temple and the *Vaikuṇṭhanātha* temple and the other *Pallava* temples in *Conjeevaram* were built, and it has been crumbling and peeling off layer after layer as in the other temples, carrying with it the inscriptions it once contained on its surface. While it is true that I could not trace any inscription in the *Pallava Grantha* script either on the base or on any other part of the temple, it is impossible to conclude that there were no *Pallava* inscriptions here. The base, where one should look for the earlier inscriptions, is badly weathered and has received many *chunam* coatings during the periodical repairs done by the temple authorities as in most of the other temples in *Conjeevaram.* Also it is submerged in the earth to a great extent.

The plinth has two rectangular mouldings, one above and the other below, with a sunk band between them. The lower moulding is of the same sandstone as that of the rest of the temple, while the moulding above is of granite. Inscriptions are found on both, but while those on the granite one are in a fairly good condition and are confined to parts of its upper side, those on the lower one are fragmentary, owning to the stone having fallen out layer after layer in many places, and run the entire length of the plinth round the temple. The inscriptions on the upper moulding appear to be two, both of the same king, *Rājendra Chola* I. After a stage the letters become faint gradually

owing to the stone getting smooth and the long line of inscriptions disappears (Ramachandran, T N , (1934) 2002, pp 12-14)

The corners of the walls bear pilasters with rearing lions at the bottom (see - Colour Plate I, fig 1 page no. 31). The corbels above these pilasters, show a curved profile suggesting the extremity of a joist and are ornamented with horizontal mouldings called by Dr. Jouveau Dubreuil "rollers," a motif which is exclusively *Pallava* ' very probably borrowed from the art of the carpenter " The niches (*koshtas)* (see - Plate I-B, fig.1, page no 15) on the walls are simply outlined, not deeply sunk as are those of Cbola times This is also the case with niches found on the walls of the *Vaikuṇthanātha* or *Perumāl* temple and the southern wall of the *Matangeśvara* temple at Conjeevaram An interesting feature of the niches both here and in the *Vaikuṇthanātha* and *Matangēśvara* temples is that the lintel, which is otherwise plain, has a handle-like projection in its centre pointing downwards and marking the central line of the niche below. The *torana* which we find in the *Pallava* monuments of *Mahendra Varman* I, of *Narasimha Varman* I (*Māmalla*) at *Mahābalipuram* and later on in monuments of the *Chola* period such as the Thajavur and *Chidambaram* temple is absent here This is strange, especially when we remember that this type of niche has to be placed, in point of time, between the niches of the *Mahendra-Māmalla* and early *Chola* epochs So when we are expecting to find in the later *Pallava* niches *toranas* of more ornate and developed form leading into the early *Chola* type, it is surprising to find here that they have disappeared No explanation for this sudden disappearance is readily available, but the similar absence of this feature in the *Vaunkuṇthanātha* temple suggests that the two are likely to date from about the same period As the construction of the *Vaikuṇthanātha* temple is established on epigraphical grounds to fall within the reign of the later *Pallava* King *Parameśvara Varman* II, the son and successor of *Rājasimha* to whom the *Kailāsanātha* temple is attributed, we may safely assign the *Chandraprabha* temple also to this period

In this connection it will be useful to quote the opinions of three scholars that deal with the subject of *Pallava* Architecture, they are Rea, Longhurst and Dubreuil The first says that the *Chandraprabha* temple "is a small building with few architectural details, and no sculptures worthy of note A peculiarity about it, due to modern additions, is the blocking up of the original shrine on the ground floor, and constructing another in the upper storey of the tower with a stair leading up to it. The temple seems of late *Pallava* date". The second has the following words -" and at *Tiruparuthikuṇram*, a hamlet three miles from the city, there is a *Jaina* temple built in the *Rajasimha* style and known as the *Varthamāna* temple It contains a number of mural paintings

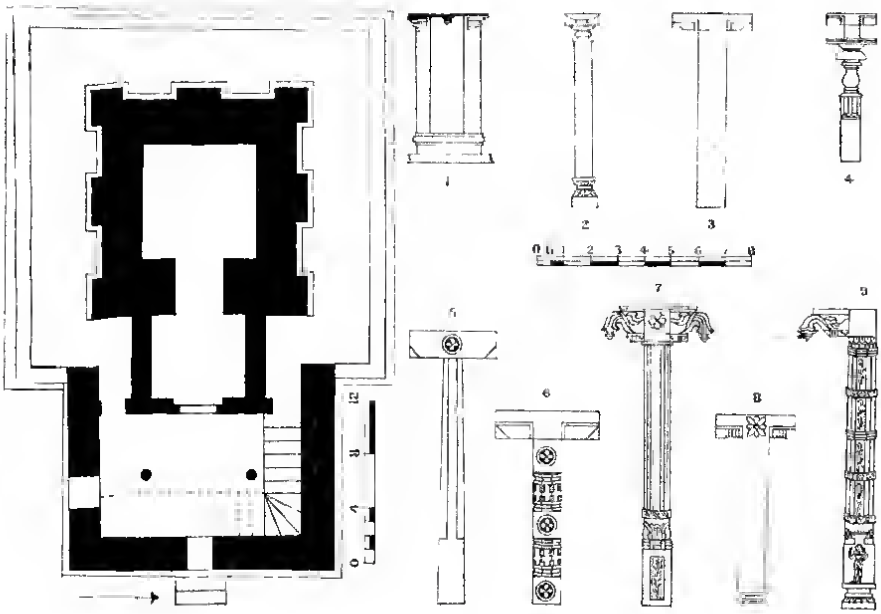


PLATE I

A Ground plan of Chandraprabha temple

B Details of architecture—

1. Pallava niche (Rājasimha style) } From Chandraprabha
2. Pallava pilaster (do) } temple
3. Chola pillar (870—1250 A.D.)
4. Chola pilaster (do)
5. Early Vijayanagara pillar (1350—1450 A.D.)
6. Late Chola pillar (1070—1250 A.D.) } From Varddhamāna
7. Early Vijayanagara pillar (1350—1450 A.D.) } temple
8. Do. do.
9. Do. do.

(Ramachandran TN. 1934. Republished - 2002)

which although of no particular artistic merit are interesting from an iconographical point of view This temple is still in use as a place of worship ' Dubreuil assigns this temple definitely to *Nandivarman Pallavamalla*, the successor of *Parameśvara Varman* II, who built the *Vaikuṇṭhanatha* temple, and his words on this point are-"Certain temples that do not bear any *Pallava* inscription, perhaps belong to the time of the *Nandivarman* dynasty Such are the Jaina temple of *Vaithamānasvāmi* at *Tirupparuttikunru* near *Conjeevaram* " (From Ramachandran, T N (1934) 2002, pp 12-14)

Inscription

There is an inscription of the 20th regnal year of *Rājarāja* III 1236 AD It states *Thyāga Samudra Battaiyar*, a chieftain had a servant by name *Biman Vadugan*, who used to serve him betel leaves and nuts The servant has endowed the temple with the land revenue income of *Nelmaliyettam* village for the morning pooja *Naivēdyam (*Offering*)* to the god

It was declared as a State Protected Monument as per G O No 118 / Tamil Development Culture and Religious Endowment Department, dated 22 6 1990, Gazette 37/Part II Section-2, dated 19 9 1990 Page 593; G.O No 23, Tamil Development Culture & Religious Endowment Department, dated 12 2 93, Gazette No 12, Part II Section-2, and dated 31 3 93 Page 379-387 This is under the Ancient Monuments and Archaeological Sites and Remains Act, 1966 (Act 25 of 1966) This act is the state counterpart of the central act under which the Archaeological Survey of India (ASI) is empowered to protect monuments The central act is called the Ancient Monuments and Archaeological Sites and Remains Act, 1958 of India This is in lieu of the earlier The Ancient Monuments Preservation Act, 1904 promulgated by Lord Curzon, the then Viceroy of India who took keen interest in conservation and restoration of our ancient heritage monuments. All the monuments in the state of Tamil Nadu are protected under the Tamil Nadu Act (25 of 1966) In 2002, like the ASI, the State Department of Archaeology also amended the rules under this act to make the first100 metres as sterile area and the next 200 metres as regulated area to regulate the spread of encroachments which tend to come up near any tourist site, under the initiative of this writer

In this chapter the monument details are presented in an alphabetical order However in order to have a coherence in reading the following monument details of the Trailokyanātha Jeenaswami Temple are brought next to Chandraprabha Temple

2. Name of the monument : *Trailokyanātha Jeenaswami* Temple

Serial No	9
District	*Kanchipuram*
Taluk	*Kanchipuram*
Village No	61
Name of the Village	*Tiruparuthikundram*
Location of the monument	75 kilometres from Chennai and part of Kanchipuram Town
	Land Survey No 169/1, 171/4
Area in Hectare	3 70, 0 64
Present Owner	Department of Archaeology
	East 169/1 Village Natham
	West 169/1 Village Natham
	South 169/1 Village Natham
	North 169/1 Village Natham
Monument Declared Date	13 08 1981
Period	Not found in Accession Register

COLOUR PLATE PAGE NO 33 AND 35

This temple is situated on the North bank of the River *Vegavati* It forms part of the Jain *Tirthankara Chandraprabha's* temple complex This is a very important Jain Centre since the 6th century AD *Mahāvira*, *Pushpadanta and Dharmadevi* sanctums are found here This temple is also called "*Trailokyanātha* temple"

Declared a State Protected Monument as per G.O No 355, Tamil Development Culture Department, dated 5.12 1988 - Gazette No 50/ dated 28.12.1988 Part II Section I, page 955 G.O No 20, Tamil Development Culture Department, dated 30 1.1990 - Gazette No 20/ dated 22 5 90/ Part II, Sec II, P.304

The *Vardhamāna* Temple (see - Plate II (plan), page no 21)

Adjacent to the temple of *Chandraprabha* and a little to the south of it, is the second and bigger temple, where several other *Tirthankaras* are worshipped, chief of them being, *Vardhamāna* (the twenty-fourth *Tirthankara*) or *Trailokyanātha* as he is locally called, from whom the temple derives its name Service is mainly conducted here Crole mentions this temple on page 116 of the Chingleput District Manual

The temple consists of two blocks, an inner one and an outer one, the former located in the centre of the temple and the latter attached to the compound wall of the temple The various parts of the inner block are as follows

An apsidal shrine dedicated to *Vardhamāna* (see - Plate II, 1) stands in the centre with two other shrines (see - Plate II, 2 and 3), one on each side of it The latter shrines are dedicated to *Pushpadanta*, the ninth *Tirthankara*, and *Dharmadevī*, respectively In front of these three shrines is a pillared hall or *Ardha maṇḍapa* which we may call the *Vardhamāna-Ardha mandapa* (see - Plate II. 4) To this is attached in front a *mukha-maṇḍapa* which we shall term the *Vardhamāna-mukha-maṇḍapa* (see - Plate II,6) Adjoining the above three shrines

and to the left of them is a group of three other shrines (see - Plate II, 7-9) dedicated to three other *Tīrthankaras*, *Padmaprabha*, *Pārśvanātha* and *Vāsupūjya*, sixth, twenty-third and twelfth *Tīrthankaras*, respectively. In front of these three shrines which we shall call the *Trikūṭa-Basti* is an *Ardha maṇḍapa* similar to the *Vardhamāna-Ardha maṇḍapa* (see - Plate II, 10). This will be referred to as the *Trikūṭa-Basti Ardha mandapa*. As in the case of the *Vardhamāna-Ardha maṇḍapa* here also there is a *mukha-maṇḍapa* (see - Plate II, 11) attached to the *Trikūṭa-Basti- Ardha mandapa* which shall be termed the *Trikūṭa-Basti- mukha-maṇḍapa* and the *Vardhamāna-Ardha maṇḍapa* and attached to them is a pillared hall *Kalyana maṇḍapa (*see - Plate II, 12*)* which we shall call the *Sangīta-maṇḍapa*, a name by which it is referred to in one of the inscriptions (No 7, p 57 from T N. Ramachandran (1934) 2002)

Vardhamāna, Pushpadanta and Dharmadevi shrines-

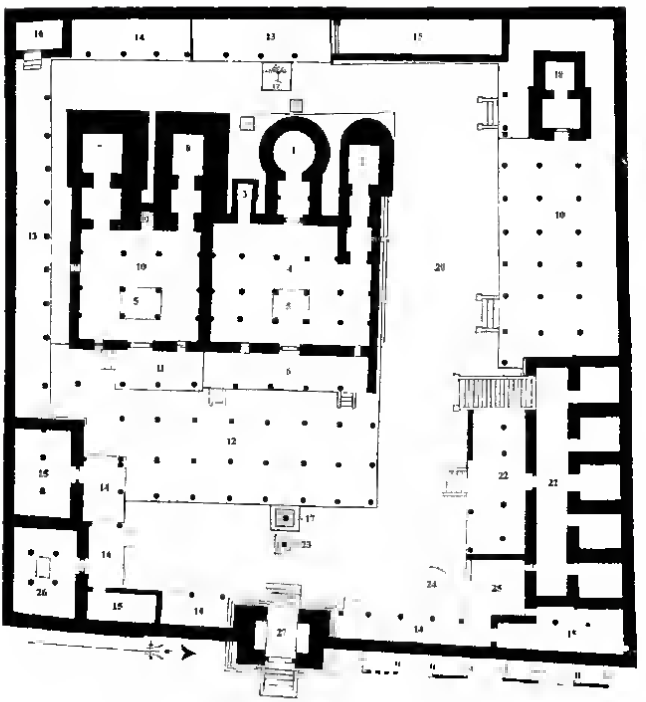
A closed shrine in which the principal *Tīrthankara Vardhamāna* is installed, with the *Vardhamāna-Ardha maṇḍapa* attached to it in front, is what appears to be the earliest part of the temple (see - Plate II, 1). There appears to be nothing left of the original shrine, the present structure being built completely of brick and mortar. Its apsidal shape, coupled with the fact that no structural temple in South India is without a shrine over which the *vimāna* arises, suggests that the earlier shrine, presumably of sand-stone, of which the *Vardhamāna-Ardha maṇḍapa* is also built, may have fallen owing to dilapidation and that at a very late stage the present brick-work probably came into existence. There appears to be nothing left of the original shrine. The present structure is of brick and mortar in apsidal shape. The earlier shrine might have been of sand stone. According to the priest, a base in granite resembling the base of the present *Vardhamāna* shrine was prepared for this temple, but for some unknown reason was not removed to the temple. It was lying there for many years, ever since the priest could remember (the priest is now 60 years of age), till very recently when it was removed to the Jaina temple at *Karandai*, about 12 miles from *Tiruparuttikunram*, a place that is said to have been the seat of the famous sage called *Akaḷaṅka*. The other shrines stand, as narrated above, one on either side of the *Vardhamāna* shrine. one for *Pushpadanta* also called *Suvidhināṭha*, the ninth *Tīrthankara* to the right (see - Plate II, 2) and the other for *Dharmadevi* also called *Ambika*, the *Yakshi* of *Neminātha*, the twenty – second *Tīrthankara* to the left (see - Pl II, 3). The fact that the deities to whom these two shrines are dedicated have nothing to do with *Vardhamāna*, who is the principal *Tīrthankara* of the temple, and that the shrines themselves seem to have been designed so that they might be crowded into the spaces on either side of the *Vardhamāna* shrine suggest for them a later date than that of this shrine (Ramachandra, TN., (1934) 2002, pp. 19-22)

It may be suggested that the original *Vardhamāna* shrine was located within the *Vardhamāna-Ardha maṇḍapa* now attached to it. But there is evidence which indicates that this was not so. At the point where the present *Vardhamāna* shrine joins the western wall of its *Ardha maṇḍapa*, the upper moulding of the outer side of this wall bears on each side of the shrine a projection, which clearly proves that either a niche or an opening originally existed between them. That it was an opening and not only a niche is shown by the moulding on the plinth. This is obscured on the southern side by the overlapping brick moulding of the shrine itself, but can be seen on the northern wall, where it shows a precisely similar projection.

Thus it would appear that there was an opening on the west wall of the *Ardha maṇḍapa* in front of the present shrine of *Vardhamāna*. The shrines of *Vardhamāna and Pushpadanta are* both apsidal, that of *Pushpadanta* (see - Plate II, 2) being smaller than that of *Vardhamāna*. As proof of frequent interference with these shrines till very recently by way of repairs, it may be noted that a little part of the southern wall of the brick shrine of *Pushpadanta* is built of irregular granite pieces loosely laid.

The shrine dedicated to *Dharmadevī*, the *Yakshī* of *Neminaātha* (see - Plate II, 3), is situated n the south of the *Vardhamāna* shrine and is totally different from the other two shrines in that it is very small and square instead of being apsidal. According to local traditions the image of *Dharmadevī* appears to have been introduced into the temple, according to one version, in the thirteenth century A.D. from the *Kāmakshī* temple at Conjeevaram, and according to another in the ninth century AD , soon after *Śankarāchārya* established the *Kāmakoti-pītha* in the *Kāmākshī* temple, both versions regard *Kāmākshī* temple as having originally been a Jaina shrine dedicated to *Dharmadevī*, the *Yakshī* of *Neminātha*. The veracity of these two versions is much disputable as the traditions themselves are of late origin, probably two centuries old. These traditions clearly suggest that the image of *Dharmadevī* was a late acquisition to the *Vardhamāna* temple. It is of brick. It has been jointed to the *Vardhamāna-Ardha maṇḍapa* by making a very narrow opening in its west wall.

While the images of *Vardhamana* and *Pushpadanta* are of wood, huge and coloured and are seated on pedestals in the *paryaṅka* attitude, i.e , cross-legged, with the hands placed one over the other (the right over the left), the image of *Dharmadevī* is small, of granite and is standing on a *padmāsana* in the *tribhanga* pose, i.e., with three bends in the body. She is shown with two hands, the right holding a blue water-lily *(nīlotpala)* and the left hanging down "like the tail of a cow." Behind her legs a lion can be seen and on the *padmāsana*, on which she is standing, are carved in relief, her two sons and an attendant woman.



PLAN OF VARDHAMANA TEMPLE.

PLATE II

Ground plan of Vardhamāna temple—

1. Vardhamāna shrine
2. Pushpadanta do.
3. Dharmadevi do.
4. Vardhamāna-Ardhamaṇḍapa
5. Elevations
6. Vardhamāna-Mukhamaṇḍapa
7. Padmaprabha shrine } together known as Trikūṭa-Basti.
8. Vāsupūjya shrine }
9. Pārśvanātha shrine
10. Trikūṭa-Basti-Ardhamaṇḍapa
11. Trikūṭa-Basti-Mukhamaṇḍapa
12. Sangīta-Maṇḍapa
13. Cloister
14. Verandas
15. Store rooms
16. Brahmadeva shrine
17. Balipīṭhas one with the "Kōre" tree on it
18. Ṛishabhadeva shrine
19. Śānti-Maṇḍapa
20. Processional path.
21. Munivāsa
22. Munivāsa-Maṇḍapa
23. Dhvaja Stambha or flag-staff.
24. Temple well
25. A small garden
26. Kitchen (maḍapalli)
27. Gopura

(Ramachandran TN 1934 Republished - 2002)

Vardhamāna **–*Ardha maṇḍapa*** (see - Plate II,4, page no. 21)

It contains three rows of six pillars each, all of them in a simple style that originated in the early *Chola* period and is still in use (see - Plate I- B, 3, page no. 15). The outside of the north wall of the *Ardha maṇḍapa* which is visible from the processional path, is of granite in the region of its plinth and of sandstone above, as in the adjoining *Chandraprabha* temple, except the lowest layer of the stone near the top moulding of the plinth, which is of granite. Four pilasters of the *Chola* type (see - Plate I-B,4, page no. 15) are found on this wall. They support two lintels, one plain and the other curved, one above the other. Over this is the eaves *(kodungai)* fitted with granite slabs designed as drooping lotus-petals. Above this is the terrace' (From T.N. Ramachandran, (1934) 2002.

3. Name of the Monument : *Chinnaiyan Kulam*

Serial No.	2
District	*Tiruvannamalai*
Taluk	*Chengam*
Village No	66
Name of the Village	Chinnayan Pettai
Location of the monument	Located between Tiruvannamalai and Arur around 40 kms from Tiruvannamalai
Land Survey No	190/1
Area in Hectare	4.50
Present Owner	Department of Archaeology North 46 Road South 190/3 Mosque 191 Part Private 183 Part Private East 190/2 Private 189/ Private 184/ Private West 46/Part Road
	92 Private
Monument Declared Date	09.04.1987
Period	16-17th century AD

COLOUR PLATE PAGE NO. 37

During the reign of the *Nayak* Kings, *Chinna Nayak* constructed this tank for the sake of his daughter. Four side steps were constructed. This tank is 120 sq. feet in circumference. Sculptures here mostly depict sexual contact between male and female, birds, reptiles etc. *Mithuna* sculptures are also there. Erotic scenes like many animals having sexual contact with women are also carved. Hookah smoking scenes and sculptures of ladies dancing are found.

There is an oral tradition that the erotic sculptures were caused to be made by the chieftain, *Chunnaya Naik* in order to get his daughter interested in this world (worldly life), there are also relief sculptures showing *Rāma* killing *Vāli*, *Sīta* in *Asokavana*, Goddess *Kāmākshi* hugging *Śiva Linga* and scenes of soldiers fighting etc. Echoes of *Khajuraho* are seen

It is believed that *Seelappa Nayak* alias *Chinnna Nayak* was living in "*Sembedu*" on the northern side of the tank. The beautiful sculptures are in Hoysala style, there are also many erotic sculptures of animals, sculptures depicting day-to-day events and war scenes etc. Declared a State Protected Monument as per G.O No 263 Tamil Development Department, dated 12 8 1987 and G.O No 158, Tamil Development Department, dated 6.5.1988.

4. Name of the Monument : *Dansborg* (Danish Fort)

Serial No	2
District	*Nagapattinam*
Taluk	*Mayiladuthurai*
Village No.	110
Name of the Village	*Sathankudi*
Location of the monument	Tarangambadi is enroute from Mayiladuthurai (old Mayuram) to Nagapattinam (old Negapatam)
Land Survey No	104/A-16, 104/A-14,104/14B,104/15A,104/15B, 104/17
Area in Hectare	1.76 0 8 2 03 2.69 0 1.11 0 40 Total : 7.17 ac.
Present Owner	State Department of Archaeology
	North : Raja Street
	East : Bay of Bengal
	South : Panchayat Road
	West : Attam Colour Road
Monument Declared Date	01 10 1980
Period	Not found in Accession Register

COLOUR PLATE PAGES NO 63 - 73

Samangalpadi, *Kulasekarapattinam* and *Tharangai* are the other names of this place. Since 1620 AD *Tarangampadi* (Tranquebar) became a Danish trade centre and later English trade centre till the 19th century AD. Naval Chief Ove Gedde met Thanjavur Raja *Raghunatha Nayak* and established Tranquebar Fort in 1620 AD.

Further Particulars
Tarangampadi (_Tranquebar_) Fort (From Kannan, Dr., R (2003), _Tarangampadi_.

A rampart wall was constructed around the *Tarangampadi* fort in 1620 AD. This rampart wall was damaged due to storms. So it looked like a mound. The State Department of Archaeology laid a trial trench in the year 2001. The base of the whole rampart wall was not exposed within the single trench. So in the next year 2002, three more trenches were laid at lower levels as offsets. The foundation and the method of construction were exposed in this excavation. This rampart wall was constructed with burnt bricks in headers - stretcher method.

Aim of the Excavation

The information gathered from different sources clearly suggests that this place continued in existence for a long period of time. The fort built in 1620 AD also went into different stages of construction and subsequent destruction. The exposed rampart wall could not give any idea on the nature of construction and subsequent modification. The non-availability of the factual data hindered

in planning the preservation of the monument. So, it was planned to take up a small preliminary excavation near the fortification wall to identify the different phases of the construction.

The entire excavation was done by Thiru T. Subramaniam, Archaeologist under the direction and guidance of Dr. R. Kannan, Ph.D., I.A.S., Commissioner of Archaeology.

Layout of the Trenches

In total, four trenches were laid in which the trench 1 (TGI-1) in the year 2001 and the remaining three in 2002 (TGI-2, TGI-3, TGI-4). The TGI-1 was near the inner edge but on the western side of the northern gate (present main entrance). The TG1-3 was laid on top of the rampart wall but above the TG1-1. The TGI-4 was laid further to the western side of theTGI-2. The size of the trench was 2x2 m except theTGI-4 which was 1x4m. It was not possible to cut-across the entire rampart at a single point as it would damage the entire structure. To avoid and prevent any further damage, the trenches were laid where the wall was coropletely damaged. Therefore, the trenches occupied different levels. The nature of deposit exposed in theTGI-1 and TGI is given below for better understanding.

Stratigraphy

Layer 1 consisted of sea sand soil and the content of the soil was almost uniform throughout the trench. The thickness of the stratum varied from 45 to 50 cm. Layer 2 having 50 cm thickness was made of loose sand mixed with pebbles. These two layers were brought to fill the rampart wall. The 30 cm thick layer 3 consisted of brownish soil and was a little hard. Brickbats, sand and lime were mixed in the soil. Layer 4 having 35 cm thick deposit was also brownish in colour but the brickbats and lime patches were found here and there. Below the layer 4, brick paved surface was exposed. Three rows of bricks were exposed. The layer 5 was yellow in colour and very loose and porous in texture. The thickness of the layer varied from 30 to 35 cms. Layer 6 was quite distinguishable from the above layer both in texture and content. This stratum was blackish in colour due to the appearance of clay contents in it. The thickness of the layer was 15 cms. The layer 7 was brownish soil and was a little hard. The average thickness of the layer was 35 cm. Brickbats and mortar were mixed with this layer. Chinese potsherds and coarse redware sherds were collected. Layer 8 was similar to the layer 7. It was also brownish in colour and the average thickness of the layer was 30 cm. Small pieces of brickbats and mortar were mixed in this layer in less quantity than the seventh layer. Below this a row of bricks were found above the natural soil. The natural soil was reached at an average depth of 2.80 meters.

Nature of Construction of the Rampart Wall

The exposure of constructional material that was found at different levels clearly suggested the method of construction. A single layer paved brick was laid right on the natural soil i.e. sea sand at this place. Above this brick paved floor, 30 cm thick compact clay mixed with brickbats and lime was laid. Above this compact earth filling, again 30 cm thick yellowish soil, locally called *tavittuman*, was used. Over this yellowish soil, another brick floor was paved. The total breadth of this floor comes to 12.25m. By leaving a metre on the interior, the rampart wall is built upon this floor covering breadth of 11.25m. The rampart wall consists of two walls each having a thickness of 75 cm. The gap between the two walls (9.25 m) is filled with brickbats, soil and sand. The total height of the wall comes to 4 m. The binding material used in the wall is lime mortar. The size of the brick is 20x13x4 cm. The upper surface of the wall slopes inward in conical shape. The upper surface is completely covered with a brick paving. The conical shape and the brick paving help to drain the rainwater as well as prevent any seepage of water into the wall surface. The outer and inner surface of the wall is plastered with lime mortar. Two layers of lime mortar were exposed. The lime mortar is again washed with red ochre. Another buttress wall having a thickness of 65 cm was added attached on the outside of the wall. It seems, this was added in later days as the size of the brick varies from that of the rampart wall. The size of the bricks used in the buttress wall is 21x12x6 cm. The bricks used in the rampart wall is made of fine clay and well burnt. All the bricks are equal in size, whereas the bricks used in the buttress wall are mixed with more sand and are irregular in shape. The buttress wall could be a late 19th Century or early 20th Century construction.

Declared a State Protected Monument as per G.O.Ms.No.906/Education Department/ 7.6.1979 - Gazette No.26/4.7.1979 Part II, Section 2 page – 369 and G.O.No.2610/Education Department, dated 6.12.1980 - Gazette No.6/18.2.1981 Part II Section 2, page 123.

5. Name of the Monument : *Manora*

In 1814 or 1815 AD, *Serfoji II* Raja of *Thanjavur* built this *'Manoratham* to felicitate his ally, the King George III for the English Victory over the French Emperor, Napoleon at the Battle of Waterloo. Inscriptions are engraved here. This is a very good example for *Mahratta* architecture. A stone castle is constructed inside of a circular moat (*Agazhi* in Tamil). Two entry points are found. On the western side, there is a place to store guns and rifles and other weapons. Gun powder storage space and shelter for soldiers have been constructed.

Serial No	4
District	*Thanjavur*
Taluk	*Pattukottai*
Village No	259
Name of the Village	*Sarabendra Raja pattinam*
Location of the monument	About 38 kilometres from Pattukottai
Land Survey No	31/9
Area in Hectare	3.01
Present Owner	Department of Archaeology North – 313 part 31/2 Patta East – 31/11 Part – Government Bay of Bengal South – 29 part Government dry West – Pond – Government Poromboke 31/10 Government Dry land 27 part patta
Monument Declared Date	09.09.1988
Period	1814 AD

COLOUR PLATE PAGES NO. 39 - 43

Inscription

There are inscriptions in five languages. The inscription in Tamil states that this tower was constructed to celebrate the victory of the English over Bonaparte, to get the friendship of the English East India Company by *Chatrapati Serfoji* in Saka 1736 (1814 AD).

Serfoji II was familiar with Tamil, Telugu, Marathi and English. The inscription found in this monument separately in languages like Tamil, English, Marathi, Persian and Telugu mentions about the reason for its construction, date, name of the king (builder) etc. Unfortunately, the important Marathi part of the inscription has been destroyed. Locally, it is stated that this was done in 1965 during the Anti- Hindi agitation. There is no proof for this.

The name of the monument is characterised in various languages as follows:

1. In Tamil — Upparigai
2. In Persian — Minar
3. In Telugu — "Thvajasowtham"
4. In English — "Column"
5. In Marathi — Mutilated beyond recognition probably Manora

Further Particulars

The Manora Tower is constructed very near to the sea shore in *Sarabendra Raja pattinam* It is 13 Kilometres from *Pattukottai* After the construction of the tower, this place was called as *Sarabendra Rasanpattinam* It is also called as *Sarabendrarasapuram*

The word '*Manora*' was thought to have been derived from *Minar*, an Urdu word But there is a Sanskrit word '*Manohara*" or pleasant One version is that because of its beautiful nature, the place might have been called as Manohara (The Maratha Rulers might have used this word, since Marathi language is based on the Sanskrit language) While researching the 'A Dictionary of English and Sanskrit Languages' of Sir Monier- Monier Williams, we found that there is a straight Marathi word ' *Manora'* for tower This was painted on the Monument Description Board in 2002, when this writer was the Commissioner of Agriculture, Archaeology and Museums The tower is similar to Trajan Roman Architecture This is a type of *Jayastamba* (Victory pillar).

The total height is 22 30 metres This monument is built with nine storeys with a moat around it There are two ways to reach this tower There is an entrance on the western side The entrance towers contain places to house arms, weapons, explosives and places to stay for the soldiers

This structure is hexagonal in shape It has a circular moat (*Agazhi* in Tamil) and a compound wall This is similar to a fort and functioned like a light house up to a certain period *Serfoji* II visited this place and stayed with his family here This has been described in his Modi script records housed in the *Saraswati Mahal*

The monument though built in *Moghul* architectural style serves also as a good example of *Mahratta* architecture

Declared a State Protected Monument as per G.O No 118, Tamil Development Culture Department, dated 22 6 1990 - Gazette No 37, Part II Section-2, dated 19 9 90 page 543 and G O No 25, Tamil Development Cultured Department, dated 12 2 1993 - Gazette No 12/Part II Section-2, date 31 3 1993 Page 379-387

6. Name of the Monument : *Rajakkal Mangalam* Sculptures *(Iraniyar Kudiyirupu)*

Serial No	2
District	*Tirunelveli*
Taluk	*Nanguneri*
Village No	54
Name of the Village	*Rajakkal Mangalam*
Location of the monument	
Land Survey No	25/1
Area in Hectare	0 73 Acre (or) 0 292 Hect
Present Owner	Department of Archaeology
	East – 25/2t – Patta Dry land
	West – 23/5 – Patta Dry land
	South – 24/ Patta Dry land
	53 Arani kulam
	North – 29/2
	75 Patharpuram Poromboke
	River
Monument Declared Date	07.12.1978
Period	7th Century AD

Further Particulars

Rajakkal Mangalam, is a village 5 kilometres from *Thalapati samudram* which is on the Tirunelveli – Nagercoil highway

Here many fine-looking early *Pandian* stone sculptures are found. They are large in size. Some of them have been taken for display to the museum in the *Tirumalai Naik* Palace. The names of the sculptures are inscribed below them on their *Peetahs* in *Grantha*. The local natives state that one *Iraniya Raja* had a palace here.

Excavations conducted at this place prove the existence of a big temple. Many sculptures have also been here. These sculptures are an important source of *Pandian* Art History. A massive *Narasimha* image, images of *Subramanya, Saptamatrikas*, (*Endisai Pengal Silai*) and *Chowri* bearers are some of the beautiful sculptures here. Many sculptures are associated with celestial bodies. *Grantha* inscriptions on sculptures are *Sadakrutu* (Indra), *Kuja* (Mars), *Budhaha* (*budha* - Mercury) and the fourth one is *Yama* (the Hindu God of Death). These sculptures are of planets and guardian deities of the eight directions of the earth (*Ashta dik palakas*).

Declared a State Protected Monument as per G.O. No 1425, Education, dated 4.8.1979 and G.O. No.7, Tamil Development Culture Department,dated 6.1.90, Gazette 27/ Part II Section and date 11.7.1990 page 388-395.

7. Name of the Monument : *Ramalinga Vilasam*

Serial No	1
District	*Ramanathapuram*
Taluk	*Ramanathapuram*
Village No	
Name of the Village	*Surangkottai*
Location of the monument	
Land Survey No	325 Sub 131
Area in Heclare	1425 sq meters 0 34 acre
Present Owner	Department of Archaeology
	North B1 Partial Patta Raja of Ramnad
	East B1 Partial Patta Raja of Ramnad
	South B1 Partial Patta Raja of Ramnad
	West B1 Partial Patta Raja of Ramnad
Monument Declared Date	12 9 1977
Period	Not found in Accession Register

COLOUR PLATE PAGES NO 75 AND 77

Further Particulars

In 1978, *Sethupathy* of *Ramnad* voluntarily handed over the *Ramalinga Vilasam* to the Tamil Nadu State Archaeology Department. The department has conserved and restored portions of it from 2002 onwards.

Themes of the Paintings on the Walls

The paintings cover themes like the epics, Puranas, wars, royal assemblies and romance. They reflect *Vijayanagar/Naik* influence. The figures are attired in variously patterned garments and heavy jewellery, both in the native and Naik style. The writing on the paintings in Telugu and Tamil give details about the panels. The rough block of stone one sees here is the coronation seat of the rulers of *Ramanathapuram*. People from North India prostrated before the seat in yester years as a token of their having completed their arduous *Kashi- Rameswaram* pilgrimage according to hearsay.

The murals were executed during the reign of *Muthu Vijayaragunatha Sethupathy* (1710-1725), who figures often in the panels. He is seen in one scene as being adorned with gems by the *Nayak* of *Madurai*. The palace itself appears to be from the 17th Century AD.

The palace complex has a cluster of buildings. The chief among them is the temple of *Sri Rajarajeswari*, the titular deity of the rulers. The sovereign of *Madurai*, *Tirumalai Nayak* gifted the golden idol to the *Sethupathies*.

Declared a State Protected Monument as per G O No 2051, Education Department, dated 12 9 1977 - Gazette No 38, Dated 12 10 1977 Part II, Section-2 P 583 and G O No 928, Education Department, 20 5 1978 - Gazette No 22, Date 7 6 1978 Part II Section 2 Page 312

Chandraprabha Jain Temple - *Kanchipuram* District

Jain temple of *Chandreprabha* - Before conservation

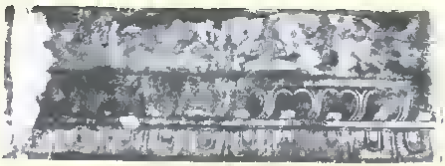
Jain temple of *Chendraprabha*,
an old picture (Plate III, figure 1 -
Ramachandran, TN. 1934 - Republished, 2002)

Chandraprabha Jain Temple - *Kanchipuram* District

Jain temple of *Chandraprabha* - After conservation

Vardhamāna (Trailokyanātha) Jain Temple - *Kanchipuram* District

The *Gopura*, *Vardhemāna* temple



(Wall painting)

Scenes from the life of *Agnilā* (*Ambikā*) or *Dharmadevī*- The transformation of *Agnilā* into the *Yakshī Ambikā* or *Dharmadevī*

(Ramachandran TN 1934 Republished - 2002)

Vardhamāna (Trailokyanātha) Jain Temple - *Kanchipuram* District

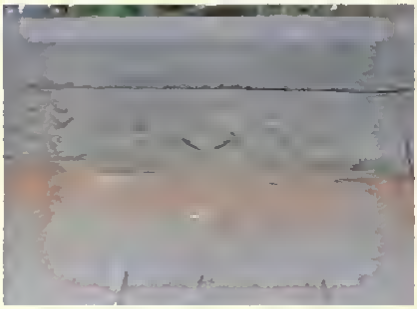
Trailokyanātha temple - Before conservation

Trailokyanātha temple - After conservation

Chinnaiyan Kulam - Tiruvannamalai

Chinnaiyan Kulam with stones displaced and vegetation - Before conservation

Chinnaiyan Kulam with stones displaced, vegetation and rubbish - Before conservation



Sculptures of *Chinnaiyan Kulam*

Dr. R Kannan Inspecting *Chinnaiyan Kulam*

Chinnaiyan Kulam - Monument Description Board

Overall view of *Chinnaiyan Kulam* - After conservation

Manora Tower - *Thanjavur* District

Manora Tower - Before conservation

Manora - *Thanjavur* District

Manora - Before conservation - crack is seen

RCC roof support given for *Manora* resulting in cracks

Laying special type of brick floor tiles at *Manora*

Manora - Restoration Teakwood Plank Covered with Lotus leaf

Binding the wood members during conservation at *Manora* with coir rope

Manora - Flooring - After conservation Consultant Chella Pillai (centre) is seen

Manora Tower - After conservation

***Manora* Tower - *Thanjavur* District**

Masilamaninathar Temple - *Tranquebar*

Masilamaninathar temple- Before *Tsunami*, 2002

Masilamaninathar temple on the shore of Bay of Bangal at *Tranquebar* - After *Tsunami* 2004

8. Name of the Monument : ***Sivan Koil, Sivapuram***

Serial No	2
District	*Kanchipuram*
Taluk	*Thiruperumpudhur* (old Sriperumpudur)
Village No	151
Name of the Village	*Sivapuram*
Location of the monument	Located in Chennai - Arakonam Highway 3 kms from Perambakkam
Land Survey No	13
Area in Hectare	0.28 Acre
Present Owner	Department of Archaeology
	North Land No 1 Govt patta
	East Plot No 16 Govt patta
	South Village Road Govt Poromboke
	West Village Natham Govt Poromboke
Monument Declared Date	26.10.1976
Period	8th Century AD

COLOUR PLATE PAGE NO 149 AND 151

This place is called as "*Ūttrukāttu Kottathu Neer Velur Nattu Urogadam*". During the reign of *Rajadhiraja I*, (1018- 1054 AD) in his 27th regnal year (1045 AD), this place was renamed as *Sivapuram*. This complete granite structural temple is called as "*Sri Rajaraja Easwaramudayan Mahavdevar Koil*" in inscriptions. It has a *Eka* (single) *Tala* (storey) *Vimana* sanctum, *Antarala*, *Ardha mandapa* and *Mukha mandapa* and niches are adorned with *Ganesa*, *Dakshinamurthi*, *Lingodhbava* and *Durga* images of *Rajaraja* times.

Inscription

A Stone inscription refers to *Sivapuram* as *Urogadam*, it states that *Arataichi*, the wife of one *Vāsudevan* of Coovam (present Cooum River area) has given 9 *Panams* for lighting a lamp (*Sandhivilakku*) in the evening in the temple. Two *Saiva* Brahmins received it. The period of the inscription is 13th Century AD of *Sundarapāndya*. There is a similar inscription for donation given by *Udaiyandai*, wife of *Kizhavan Vadugan Vizhupariayan*, landlord of *Māthur*. This inscription has been issued in the 15th regnal year of *Sundarapandya*.

According to the inscriptions, a canal had been dug for the supply of water from the *Cooum* River to this temple.

Declared a State Protected Monument as per G.O.No 618, Education, dated 14.3.1977 - Gazette No. Part II, Section 2, date 13.4.1977 p.180 and 181 and G.O.No.1109/Education/ dated 17.6.1978 - Gazette No 27/dated 12.7.1978

9. Name of the Monument : *Swastik* Well

Serial No	1
District	*Tiruchirapalli*
Taluk	*Lalgudi*
Village No	9
Name of the Village	*Tiruvellarai*
Location of the monument	Behind the temple outside the walls on the North West Corner - well away from the temple
Land Survey No	12
Area in Hectare	5.09 Acre
Present Owner	Department of Archaeology
	North – 215 Poromboke
	East – 12 (partial)
	South – 217
	10 partial patta
	West – 218 partial patta
Monument Declared Date	10.10.1974
Period	800 AD

COLOUR PLATE PAGE NO 111

During the reign of *Nandivarman*, *Aiambakkattu Nalluzhan Thambi Kamban Araiyan* has excavated this well. This well is also called as "*Marbidugu*" *perum kinaru*

Further Particulars

The design is such that the shape of the Swastika makes the ladies bathing in one arm invisible to the males bathing in another arm. It is actually a stepped tank, though called a well in the Monument Register.

Inscription

An inscription has been found which states that worldly life is impermanent. This is the only Swastik shaped tank in Tamil Nadu.

ஸ்ரீ கண்டார் காணா உலகத்திர காதல் செய்து நில்லாதேய்
பண்டேய் பரமன் படைத்த நாள் பார்த்து நின்று நைய்யாதேய்
தண்டார் மூப்பு வந்துன்னை தளரச்செய்து நில்லா முன்
உன்டேல் லுண்டு மிக்கது உலகம் மறிய வைம்மினேய்

Declared a State Protected Monument as per G.O No 702/Education Department, dated 5.5.1975 - Gazette Part II, Section-2, dated 26.1.1977 and G.O No 2832/Education department/Date 31.12.1976 - Gazette No 3, Part II, Section-2, date 26.1.1977.

10. Name of the Monument : *Thanjavur* Palace

Serial No	2
District	*Thanjavur*
Taluk	*Thanjavur*
Village No	Not available
Name of the Village	*Palliagraharam*
Location of the monument	On the road to Tiruvaiyaru
Land Survey No	2305/1, 2305/2., 2305/3, 2305/4, 2305/6
Area in Hectare	12.613973
Present Owner	Department of Archaeology
	North .. Corporation
	East .. Highway Road
	South Municipal Road
	West .. Patta
Monument Declared Date	4.10.1980
Period	Not stated in Register

COLOUR PLATE PAGES NO 113 - 117

Declared a State Protected Monument as per G.O.No.2752/ Education Department, dated 26.12.1980 - Gazette No 5, Part II Section-2, and dated 11.2.1981 p.101 and G.O.No 367, Tamil Development Culture Department, dated 15.12.1988 - Gazette No 1/Part II - Section 2, dated 4.1.89 p.26.

Further Particulars

The palace complex houses among others the famous *Saraswathi Mahal* Library. It has famous buildings like the *Sartaj Mahal* and the Arsenal Tower, the bottom of which houses the famous *Thanjavur* Art Gallery. During the VIII World Tamil conference, the bottom of the Arsenal Tower was excavated and a temple was found. The complex was conserved and restored in 1993 – 1994. The *Sartaj Mahal* is also called the *Kalyana Mahal*. The *Durbar Hall* of the palace was partially conserved and part of the palace complex itself especially the *Naik* period *Mandapa*, which falls under the control of the State Department of Archaeology was not conserved. This part has been conserved in 2002-2003 from the grants of the Eleventh Finance Commission.

The palace complex bears clear signs of *Mahratta* architecture but the *Mandapa* which has been conserved is of the *Naik* period circa 16th century AD.

11. Name of the Monument : *Tirumalai Naik Mahal* (Palace)

Serial No	1
District	*Madurai*
Taluk	*Madurai*
Village No	Ward No 2 Block 14
Name of the Village	*Madurai Town*
Location of the monument	
Land Survey No	260 23 24/20
Area in Hectare	2 Acre
Present Owner	Department of Archaeology
	North 1206/4, 3197 1197 1198, 1201, 1202 1231
	East 1207 Corporation school
	South 862 Pandhadai Mudali Street
	West Plot
Monument Declared Date	21 11 1972
Period	Not found in Register

COLOUR PLATE PAGES NO 119 - 125

Further Particulars

Madurai was a provincial capital under Vijayanagara rule, its governors (*Naiks* or *Nayakas*), declared independence towards the middle of 16th century AD, and for the next hundred years ruled over a wealthy kingdom The most famous of the *Madurai Naiks* was *Tirumalai Naik* (regnal years- 1623-59) He built the famous palace called *Tirumalai Naik* Palace and made extensions to the great *Meenakshi* temple in the centre of the city The Nawabs of Arcot put an end to this line of *Naiks* when they absorbed *Madurai* into their own kingdom towards the end of the 17th Century AD.

Large portions of the *Naik* Palace gradually collapsed or were dismantled by the British in the XIX Century AD, while some parts were completely restored in 1871-82 AD. The two remaining fragments, the Darbar Hall and Dance Hall, are impressive for the grand scale of the interior spaces and baroque plaster ornamentation A large court surrounded by colonnades leads to the Darbar Hall The interior presents perspectives of solid circular piers that support broad arches with pointed and cusped profiles It is roofed by alternating pyramidal domes and shallow vaults, some raised on cloistered walls with small windows to admit light, with a larger octagonal dome over the throne area Plaster ornamentation is seen on the arches and vaults with lotus and foliage motifs, elephants with beasts etc The exterior has animal brackets carrying the eaves, and lotus finials crowning the domes and vaults The *Swarga Vilasam* or the Celestial Pavilion, measuring 75mx52m, is constructed entirely of brick and mortar without the support of a single rafter or girder Among the other striking features of the palace are the massive white pillars, several of which line the corridor that runs along the courtyard Connected by well-decorated arches, these pillars measure 20m in height and have a circumference of 4m.

The *Nritya Sabha* (*Nataka Salai*) , or Dance Hall, which adjoins the Darbar Hall, at its north - east corner, has a double - height central space, flanked on two sides by an arcade below and chambers with arched windows above, the floor is raised slightly at the eastern end Pilasters on the upper level are concealed by sculptures of birds in high relief Transverse arches support the point vault The cupola of the arches are richly encrusted with plaster animals and birds in scroll work, flame-like motifs protrude from the fringes and there are monster heads at the apexes Much of this plasterwork dates form the 19th century restoration of the palace A second court surrounded by colonnades with a domed chamber had adjoined the Dance Hall in the east, it no longer stands Only the foundation is seen

Conservation had been attempted in the 19th Century itself Robert Chisholm, the famous English architect had put in place a system of tie-rods and counterweights of steel to prevent the domes from cracking The tie-rods had not been loosened and tightened in summer and winter as was originally intended So the system did not work, when this writer inspected the monument. Buttress walls, another 19th Century feature had also been put up all around the outer wall This was due to their fear that it would fall outwards After conservation of the domes, the tie-rods were no longer found necessary

Declared a State Protected Monument as per G.O No 1845, Education Department dated 21 11 1972 - Gazette No 42, dated 6 12 1972, pp 992-993

12. Name of the Monument : *Tirumalai Naik Mandapam*

Further Particulars

Alagerkovil is 24 kilometres away from *Madurai* An ancient *Vishnu* temple which dates to the Sangam period circa 2nd Century BC is situated there *Tirumalai Naik* built one *mandapa* inside the temple fortification wall The *mandapa* is datable to the 17th Century AD A portrait sculpture of *Tirumalai Naik* is found here This portrait sculpture excels similar ones in places like *Srivilliputtur Tiruparankundram*, *Tirupuvanam* and the New *Mandapam Madurai*.

Serial No	I
District	*Madurai*
Taluk	*Melur*
Village No	53
Name of the Village	*Valaiyapatti*
Location of the monument	
Land Survey No	85/1A
Area in Hectare	0 03731 or 373 1 sq meters
Present Owner	HR & CE but under the Protection of the State Department of Archaeology
	East - 85/1A
	West - 85/1A
	South - 85/1A
	North - 85/1A
Monument Declared Date	31.3 1987
Period	Not stated in Register

COLOUR PLATE PAGE NO 143

The portrait sculptures of the two queens of *Tirumalai Naik* are beautifully portrayed. The drapery and ornaments are noteworthy. The same type of ornaments are in use with the local people even today. Portrait sculptures of *Tirumalai Naik's* brother *Muthialu Naik*, his queens and other officials are found in this *mandapa*. This *mandapa* is a veritable store house of *Naik* art and sculptural wealth. This is a state protected monument.

Declared a State Protected Monument as per G.O.No 284, Tamil Development Culture Department, dated 8.9.1987 - Gazette No 38, Part II, Section II, dated 30.9.1987 page 763 and G.O.No.279, Tamil Development Culture Department, dated 5.7.88.

13. Name of the Monument : Granary - *Tirupalaithurai*

Serial No	4
District	*Thanjavur*
Taluk	*Papanasam*
Village No	22/3
Name of the Village	*Tirupalaithurai*
Location of the monument	
Land Survey No	280/1 part
Area in Hectare	9.50 Cent or 0.038 Hect
Present Owner	Department of Archaeology
	North 281
	South 280/1 (part) & 280/2 (part)
	East 280/5
	West 280/1 (part)
Monument Declared Date	30.3.1989
Period	Not entered in Accession Register

COLOUR PLATE PAGES NO 145 AND 147

Further Particulars

The Giant Granary at *Tirupalaithurai* was constructed by *Govinda Dikshitar*, Dewan (Prime minister) of *Raghunatha Naik*, Ruler of *Thanjavur* (1600 – 1635 AD). There is a similar one at *Srirangam*. It was meant for storing paddy during the peak harvest time in the Tanjore Delta.

Declared a State Protected Monument as per GO No 89,TDC, and Dated 30.3.1989 and Gazette Part II Section 2 Date 3.5.1989, GO No 99, TDC, Dated 31.5.1990

14. Name of the Monument : *Udayagiri* Fort and *De-Lanoy's* Cemetry

Further Particulars

It was constructed as a mud fort in 1600 AD by the *Venad Raja*, *Sri Veera Ravivarma* (1595-1607 A D) It was reconstructed as a stone fort under the supervision of Captain *De-Lanoy*, a Dutch Captain who took service under *Mahārāja Mārthānda Varma* of *Travancore* in 1744 AD. He was defeated at the Battle of *Colachel* in 1741 AD. A pillar commemorates the battle, which can be seen at *Colachel*.

The fort is constructed on a mound of 260 feet height It has an extent of 85 Acres. The height of the wall of the fort is 18 feet and it is 15 feet broad. There are 10 watchtowers, out of which five were to fit bear cannons. The main entrance is on the west. There was a factory manufacturing cannons, whose quality was on par with the best canons imported from the west. Some of the cannon balls have been recovered within the past 50 years. They are kept in the Sub Collector's office at *Padmanābhapuram* and the Government Museum, *Kanyakumari*.

Serial No	1
District	*Kanyakumari*
Taluk	*Kalkulam*
Village No	*Padmanabhapuram Town*
Name of the Village	Ward No 5 Block 05 9
Location of the monument	
Land Survey No	
Area in Hectare	Fort walls Cemetery and 21 Acre 50 sq meters
Present Owner	
	North 25/98 Till Poromboke
	South D2 Rocky pond
	D4 Private
	D7 Patta
	Fort Walls South to North
	East D6 Private
	D7 Patta Canal
	North D7 Road
	D5/1,5 Patta 4,2
	South D5/9-10 Till Poromboke
	D5/9-6 Till Poromboke
	D5/9-2 Till Poromboke
	Fort Wall North to South
	West
	East Private Patta
	D5/9-2 Poromboke
	D5/9-4 Natham
	D5/9-5 Temple Poromboke
	D5/9-8
	De-Lanoy
	North
	South 05/9-8 Poromboke
	East
	West
Monument Declared Date	18 07 1996
Period	Not entered in Register

COLOUR PLATE PAGES NO 153 – 157

The tombs of Captain *De-Lanoy* and his family are found within the fort. They were renovated in 2002-2003.

Declared a State Protected Monument as per G O No 271, Tamil Development Culture Department, dated 19 11 1996

15. Name of the Monument : *Vettuvankoil*

Further Particulars

This is 150 kilometres from *Madurai* It is located between *Sankaran koil* and *Kovilpatty* An inscription records that some Jains were put to death on stakes during the reign of *Ninrascer Nedumaran Pāndya* king alias *Arikesari Maravarman* alias *Kun Pandyan* (670-700 AD) There are a lot of caves and Jain exquisite bas-relief sculptures The *Kailāsanātha* temple here is a monolith, which was built during the reign of *Māran Chadaiyan* alias *Jatila Parantakan Nedunchadyan* (765-815 AD)

Serial No	4
District	*Thuttukudi*
Taluk	*Kovilpattu*
Village No	91
Name of the Village	*Kalugumalai*
Location of the monument	
Land Survey No	280/6 280 part Jain abode 280 part
Area in Hectare	20 84 Hect 3025 sq meter 560 3585
Present Owner	Department of Archaeology North 280 part Govt Poromboke South East West West 280/6 part Street Natham Part 280/1 5,7 – Patta land South 76 Part – Natham 280/88 part Natham
Monument Declared Date	07 12 1978
Period	Not entered in Register

COLOUR PLATE PAGE NO 189

Declared a State Protected Monument as per G O No 1425, Education, dated 4 8 1979 and G.O No 7, Tamil Development Culture Department,dated 6 1 90 and Gazette No 27, part II date 11 7 1990 page 388-395

16. Name of the Monument : *Vittal Koil*

Serial No	4
District	*Kanchipuram*
Taluk	*Chengalpattu*
Village No	176
Name of the Village	*Vittalapuram*
Location of the monument	Around 70 kms from Chennai
Chennai-Pudupattinam highways	
Land Survey No	408/3
Area in Hectare	4 503 15 Acres
Present Owner	Department of Archaeology North 408/2 Govt way East 402,403 Patta South 407 405 Main Road West 409 Patta
Monument Declared Date	28 8 1978
Period	16th century AD 1521A D

COLOUR PLATE PAGES NO 175 185

Krishna Avatar is one among the ten avatars of *Vishnu* Krishna's other form is *Vittala* In Tamil Nadu, this is the only temple dedicated to *Vittala* of the 16th Century AD *Vittala* is considered as the family deity of the *Vijayanagara Kings* In *Srirangam*, a *sannidhi* is dedicated to *Vittala* In *Hampi*, a shrine is dedicated to*Vittala* The settlement and temple here was established by the Emperor *Krishna Devaraya* in the 16th century The *Vittala* image is in standing posture, the left hand holds a conch, while the right hand is in *abayahastha*

Further Particulars

It is 75 kilometres from Chennai on the East Coast Road (ECR) Highway, away from *Kalpakkam*. There are four Tamil inscriptions. One inscription of the period of *Sadāsivarāya*, the Vijayanagar Emperor in 1558 AD, states that the temple was renovated and a car festival was held. Another inscription describes endowments by *Lakshmīnātha* of *Mahabalipuram*. The most important inscription describes that this village was named as *Vittalāpuram*. This temple was built by *Krishnadevarāya*, *Vijayanagar Emperor* (1509 – 1530 AD). The monument protection board gives the period as 1507-1529 AD. Such slight differences do arise in Indian history due to the various calendars like Telugu, Tamil, *Sālivāhana Sāka* and *Vikrama Sāka* followed. The temple as per the board was built by *Kondaya Chōla Dēva Maharaja*, one of the chieftains/officials of *Krishna Dēva Raya*. In the period of *Sadāsivarāya*, as stated above, a car festival was held. The temple was constructed as a replica of the temple at Hampi, the capital of the *Vijayanagar Empire*.

Declared a State Protected Monument as per G.O No 1596, Education, dated 28.8.1978 and G.O No 1224, Education, dated 14.6.1982 - Gazette 27/14.7.1982 Page 455.

ROCK ART AND CAVE ART

What is Rock And Cave Art ?

Art work created against the richly textured background on the rocks, the walls, and the ceilings is designated as 'Rock Art'. It can also be extended to cover the art, both paintings and sculpture done on rocks and caves by the people during the historic period. In this way, the term 'rock art' applies to an array of art works such as 'Paintings', 'Engravings', 'Carvings', 'Sculptures', 'Cupules' that have been depicted over the rock surface of rock shelters, popularly known as 'Caves'. And hence, Rock Art is also referred to as 'Cave Art' in the common parlance.

Rock Art: A General Perspective

Mankind stayed either permanently or otherwise at the rock shelters carrying out its day-to-day activities including ritual, religious and other cultural practices. During such activities it indulged in artistic expressions of both pictorial decorations in the form of rock paintings (i.e. Petrographs) and plastic decorations in the form of rock engravings (i.e. petroglyphs).

Besides, the rock art represents successive stages of human adventure, from the stone age to the present-day-hunting-gathering, pastoral and incipient agricultural societies whose cultures are threatened with extinction. On the whole, the rock art, which are executed by primitive artists, clearly display their close perception of animals and human beings in relation to the environment and

their culture, of the features and the moods. They exist either in outline or in silhouette yet forceful in the sweep of the lines displaying the moods of the animals and the human beings.

Techniques employed in Rock Art

The choice of the technique is often related to the type of rock being used as the canvas for creating and depicting rock art forms. The rock art are generally found in the form of Petrographs in red ochre, yellow ochre, white ochre and rarely in orange, green or black. The Petrographs are normally painted on vertical or near vertical rock faces or on the under surface of projecting or overhanging rocks.

The painting technique is often the 'Wet Colour Technique'. The colour used to paint the Petrographs were hematite red in various tones or white or yellow or black or blue tints. However, no attempt was made to dress the rock, which was neither plastered nor painted before depicting the art forms. In other words, the pigments have been applied straight on the rock surface.

In the case of petroglyphs, the tool (mostly hand-axe stone tool or metallic tool in a lesser degree) was used to peck or bruise or batter or groove or engrave the rock surface by employing a hammer stone tool over it. In any case, the rock surface was never chiselled. Percussion with a pointed stone tool, probably a hand-axe, produces the cupules. Here, the blows were administered from above rather than from below or sideways, as they generally occur on vertical surfaces of the rock canvas.

Pigments used in Rock Art

Naturally occurring earth pigments such as red ochre, yellow ochre and white clay were used in painting the Petrographs. In other words, the earth colours, which were available as pigments in the vicinity of the rock shelters as residual products of the rocks, were utilized to paint the rock art. The compounds found in these earth pigments were identified as follows.

Red	Oxides of iron like hematite
Orange	Oxides of iron like hematite
Brown	Oxides of iron like hematite
Yellow	Oxides of iron like hematite
White	Kaolin
Black	Magnesium Oxide
Deep Purple	Magnesium Oxide
Green	Compounds of Copper

Medium used in *Rock Art*

In some cases, the pigments have permeated deep into the fabric of the rock, indicating their use in a fine liquid form. Such kind of preparation of medium in a fine liquid form must have entailed the laborious process of pulverisation of the lumps of naturally occurring pigments and levigation of powder in water for preparation of a fine aqueous suspension. By the longevity of the rock art it can be presumed that water was the medium used for the pigments and it is probable that the slow action of water on the siliceous rock resulted in the formation of colloidal silica and the latter produced an imperceptible layer on the pigments, thereby fixing them firmly to the rock surface and in turn render them immune to the solvent action of water.

Perumukkal

Our team members including the writer climbed to the petroglyph site *Perumukkal* near *Tindivanam* which is one of the three Petroglyph sites of India (see - Colour Plate XL, page no. 189). The Petroglyph is in a cave near the top of the hill. *Perumukkal* also has a temple, which dates from the *Chola* period. Construction lasts right up to the post *Vijayanagara* period. Parts of the temple are in need of renovation. The temple itself is not under the protection of the State Department of Archaeology but the Petroglyph site is. Professor Madhivanan sees in these Petroglyphs, which are made of cupules i.e. scooping out of rock by small rocky stones, figures, which show the *Ramayana*.

Kīlvālai

Kīlvālai, is 22 km from *Villupuram*. It has a *pyramid* like entrance made of a huge rocky boulders. The red ochre Rock Art is very old and has some symbols, the cross symbol closed on both sides, that are supposed to be the fore runner of the Indus Valley Script. There is a figure on horseback, two people leading the person riding on the horse back.

Ālambādi

This is a *Rock Art* site, *Ālambādi* which is a little further from *Kīlvālai* on the same Villupuram-Gingee Road. This site is famous for its x-ray paintings, which are supposed to represent a pre-historic anatomy class. The x-ray paintings are supposed to depict the internal organs of animals and it is felt that some teacher is teaching them to the students. *Charaka* was a great surgeon and *Susruta* was a great physician in India, but they are of the historic period while this *Rock Art* is from the pre-historic period.

The writer has given a stylistic and chronological classification of *Rock Art* and *Cave Art* for Tamil Nadu in the Bulletin - Monograph on *Rock Art* and *Cave Art* (Kannan Dr. R., 2003, pp.24-35).

17. Name of the Monument : *Rock Art - Ālambādi*

Serial No	8
District	*Villupuram*
Taluk	*Tirukovilur*
Village No	128
Name of the Village	*Ālambādi*
Location of the monument	
Land Survey No	115
Area in Hectare	0.530
Present Owner	Department of Archaeology
	North 11-4
	11-3 Private dry land
	11-6
	East 20 Private Dry land
	South 11-10 Private Dry land
	West 11-2 Government Canal
Monument Declared Date	01-04-1987
Period	Not entered in Register

COLOUR PLATE PAGE NO 187

As per that clarification *Perumukkal* figures in Style 1 the earliest period *Ālambādi*, *Kilvālai*, *Melvālai*, *Sethavarai* figure in Styles 3, 4, 6 These are from Mesolithic period or earlier – i.e Period I *Ālambādi* figures in Period II - Neolithic/Chalcolithic and early iron age also.

There are also superimpositions in Cave Art (Kannan Dr. R., 2003, pp.40-41)

Further Particulars

Ālambādi is very near to a village, *Kandachipuram* of Tirukovilur Taluk *Rock Art* painting is found here in natural boulders found on the western side of the village Paintings of animals have been painted on the rock surface

In Tamil Nadu, this is the first place where X ray paintings were discovered A deer and a bull have been painted in X ray form

Declared a State Protected Monument as per G.O No 220, Tamil Development Culture Department,dated 5.7.1988 - Gazette No 33, Part II, Sec 2, dated 24.8.1988 and G.O.No 139, Tamil Development Culture Department, dated 10.05.1989 - Gazette No 21/ Part II Sec 2, dated 31.5.1989 – p.396

18. Name of the Monument : *Rock Art – Melvālai*

Further Particulars

Declared a State Protected Monument as per G.O.no.416, Education, dated.11.4.1984 - Gazette No.19/dated.16.5.1984, Part II, Sec.2, P.413 and G.O.No.322, Tamil Development Department,dated.5.11.1985 and G.O.No.66, Tamil Development Department,dated.13.3.1987 - Gazette No.49, dated.18.12.1985 Part II, p.941

Serial No	7
District	*Villupuram*
Taluk	*Tirukovilur*
Village No	140
Name of the Village	*Melvalai*
Location of the monument	
Land Survey No	91/3 95/8 98 0.18.0 0.58.0 2.88.0
Area in Hectare	Government Hillock
Present Owner	Department of Archaeology North – 96 West – 97 South 99 East Patta North 95 Private West 94 South 95 East 95 part Patta North 91 part Patta Private Private West South East 96
Monument Declared Date	16.5.1984
Period	Not entered in Register

19. Name of the Monument : *Perumukkal* (*Muktileswara* Temple and *Sita* Cave)

Serial No	6
District	*Villupuram*
Taluk	*Tindivanam*
Village No	145
Name of the Village	*Perumukkal*
Location of the monument	11 kms in Tindivanam - Marakkanam Road
Land Survey No	266
Area in Hectare	5780 sq. meter
Present Owner	Government Poromboke Department of Archaeology 266 approximately 1/2 km length East 266/3 West 266/3 Government Poromboke South – 266/3 North – 266/3
Monument Declared Date	11.09.1995
Period	Not entered in the Register

'*Thiruvanmigai Eswaramudaiyar*' granite structure is in Perumukkal hillock. This *Thiruvanmigai Eswaraamudaiyar* alias *Perumukkal Udaiyar* is Sanskritised as *Mukyachaleswara* temple. *Rajagopuram*, *Prakara* and *mandapas* with sanctum of this temple are very early. The early brick structure was fully made as granite during the reign of *Vikramachola*

Further Particulars

Mukyachaleswara Temple – Perumukkal

Perumukkal is located 11 kilometres in the highway between *Tindivanam* and *Marakanam* Three big boulders that surrounded this village is the reason for the name *Perumukkal* (Three big stones). A Sangam poet, *Nalvellayar* is a native of village '*Mukkal*'

The structural temple of *Mukyachaleswara* or *Thiruvanmigai Iswaramudaiyar* alias *Permukkal Mukkal Udaiyar temple* was constructed on top of the hillock. This ancient temple consists of a *Ra*(y)*jagopura*, *Prakaras* and *Mandapas* with a sanctum.

This temple remained as a brick temple till the reign of *Kulottunga I*. This brick temple was converted into a granite structure during the reign of *Vikrama Chola* by a person named *'Konurudiyan Araiyan Kakku Nayagan ana Kangarayan* who also laid a temple garden. One *Peythalai perumangalinudaiyan Periyan Thiruvan ana Siruthondan*' assisted him in the construction. A major area of the temple has been damaged due to the war that occurred during the British rule.

One *Vijayalayanana Kakkunayagan* installed a Ganesa in the *Devakoshta* of the *Ardhamandapa*. This has been described in the stone inscription found below the *Makara torana*. But there is no *Ganesa* idol now. The idol of *Dakshinamurti* is also not found in its place. Portrait sculptures of two devotees are found here along with inscriptions. One inscription states *Perumangala Mudaiyan Thiruvan ana Siruthondan* and the other states '*Saivasrayan Athreyan Thiruchitrambala Mudaiyan Anbarkarasa Battan*'. A third portrait sculpture is found without any inscription. A *Jain Tirthankara* idol was found outside the temple in the village at the foothill in 2002, when we visited.

In the rock boulders, we found around sixty inscriptions of *Cholas*, *Pandyas*, *Kadavarayas*, *Sambuvarayas* and *Vijayanagara* kings. These inscriptions narrate very interesting stories. Temple lands were sold in auction. Land was measured with a 12 foot measuring rod. *Kothai Azhviyana piravu vari Nangai* a *Thevaradiyar* (nun) installed a Ganesa image at *Thirukamakottam*. A stone slab found in the Hanuman temple has an inscription of *Uttamachola*. It gives information, that one *Amabalavan Kandaradittan* built a temple here.

One female servant lost her life for the well being (to get cure from epidemic) of king, *Rajaraja Sambuvarayan*.

Sita Cave

On the western side of the hill a natural cavern is found. Local people call this place as *Sita cave*.

Petroglyph letters and a *Vatteluttu* inscription are found here. Some scholars opine that the graffiti mark is contemporary to the *Hieroglyphs* of *Egypt*. This writer has dated it in his book on *Rock Art*, which has found general acceptance. Some human figures, animals, circles and multiplication marks are found.

Vatteluttu inscription characters in Tamil resemble those of the 6-7th Century AD.

Declared a State Protected Monument as per G.O. (standing) No.241, Tamil Development Culture & Religious Endowment Department, dated 26.7.2000.

20. Name of Monument : *Rock Art - Settavarai*

This village is 8 kilometres away from *Kīlvālai*. Pre historic paintings are found in the natural rock shelters in a hillock locally called as *Ayyanar Malai*. The picture of a big deer has been painted here. Shields, spears painted show that a hunting community society lived here once. A big bull and fire painted together shows that the people who lived here were aware of fire. One picture here is similar to the common fire walk ceremony of Tamil Nadu. About 17 pictures painted here are mostly about animals viz., deer, bull, goat, hand of human, sword, ass, elephant's trunk, bison, pig and camel. A Buffalo painted here is shown with bones by drawing some lines. This kind of picture is called 'X-Ray painting'.

Serial No	
District	*Villupuram*
Taluk	*Gingee*
Village No	75
Name of the Village	*Settavarai* This place is en route Gingee Tovettavalam via Nallanpillai petral 8 kms away from *Kīlvālai*
Location of the monument	
Land Survey No.	45
Area in Hectare	0.37
Present Owner	Department of Archaeology North 45 part Hill Government South 45 Part Hill Government East 43 42 29 Patta Private West 45 Part Government
Monument Declared Date	26.3.1986
Period	Before 1,000 B.C.

COLOUR PLATE PAGE NO. 187

One human figure is also found in *Settavarai*. The man's nose is very similar to that of the painting in *Kīlvālai*.

Further Particulars

Declared a State Protected Monument as per G.O. No.81, Tamil Development culture Department,dated 26.3.1986 - Gazette No 15, dated 16.4.1986/Part II, Sec 2, p 339 and G.O. No 80, Tamil Development Culture Department,dated 23.3.1987 - Gazette No 15/Date 22.4.1987 Part II, Sect 2,p 268.

COLOUR PLATE - IX

Dansborg Fort - *Tranquebar*

Dansborg - Before conservation

Dr R Kannan studying the Fort - Before conservation

Dr R Kannan prescribing the Methodology for plastering the de-plastered ceiling

Dr R Kannan studying the deterioration of the Stone Tablet during conservation

Dansborg entrance - Before conservation

Restored Foundation Slab of *Dansborg*

Dansborg Fort - *Tranquebar*

Dansborg - After partial conservation - 2002
The Before and After portions are clearly seen

White of eggs used in lime mortar
for *Moghul* plaster

Traditional grinding of lime mortar

Dr R Kannan inspecting iron members
of the window

Dr R. Kannan inspecting the excavation site
at *Tranquebar* before conserving rampart wall

Dansborg Fort - *Tranquebar*

Crack mending method with Copper plate

Dr R Kannan In dhoti, Inspects the Fire place

Central Domes - Before conservation

Dansborg - View showing the four domes - After conservation

Dansborg - View showing the steel belt fastened to the bolt covered with combination plaster

Dansborg - Closeup view showing one of the four domes after conservation - note the central steel cap covered with combination mortar plaster

Dansborg - Central Dome Tie Rods conserved

Dansborg Fort - *Tranquebar*

Dansborg Front view - After conservation

Fully conserved Dutch Fort, *Tranquebar*

Dansborg Rear view - After conservation

Dansborg Fort - *Tranquebar*

Dansborg Rear view - After conservation (another angle)

Dansborg at night, under lighting

Barrel vaulted roof - Before conservation

Barrel vaulted roof - After conservation

Dansborg Fort - *Tranquebar*

Dr R Kannan in front of the newly conserved Fort entrance - (After)

Tranquebar Fort Inauguration Tablet (2002)

At the inauguration after the restoration of the *Danish Governor s Residence, Danish Fort* at *Tranquebar*
(Right to Left) Dr R Kannan, the then Commissioner of Archaeology and Museums lighting the *kuthuvilakku* (ceremonial lamp)
(Late) Thiru K Lakshminarayanan Assistant Director, Department of Museums, Government Museum Chennai,
Thiru K T Narasimhan Superintending Archaeologist, Archaeological Survey of India
Thiru Chandramoorthy the then Assistant Director, State Department of Archaeology

Ramalinga Vilasam - Ramanathapuram

Ramalinga Vilasam Palace at Ramnad - Front view
Before conservation

Ramalinga Vilasam Palace (first floor) - Before conservation

Ramalinga Vilasam - Murals - Before conservation

Ramalinga Vilasam Palace Ceiling murals (first floor)

Ramalinga Vilasam - Murals - After conservation

Ramalinga Vilasam - Ramanathapuram

Ramalinga Vilasam - Front view - After conservation

Conserved *Ramalinga Vilasam* Palace at *Ramanathapuram*

CHAPTER III

TECHNIQUES OF CONSERVATION

Archaeological conservation and restoration work is not a normal Public Works Department type of work used to repair and maintain government buildings using modern technology. It is of a specialised nature using ancient techniques and supplemented by modern techniques where absolutely necessary as seen in the Introductory chapter. The principles of Conservation and Restoration vide Articles 3, 9 and 10 of the Venice Charter, 1964 have been described in the Introductory chapter.

In this chapter, against this backdrop, we shall see the principles of conservation and their application to particular monuments in general. The notes of inspection on each monument will be seen in the succeeding chapters.

Principles of Conservation and Restoration

1. Reversibility of process – as far as possible, the action of the conservator should be capable of being reversed since at a later date a better technology may be available. This is a predilection in favour of conservation vis-a vis restoration.

2. The aged patina on granite walls, pillars, sculptures as well as brick walls, in short any ancient material should not be removed unless absolutely necessary. The original colour plan should not be changed. E.g. certain thin crusts sometimes form on the stone over a long period of time. This is due to natural agencies, which is pleasing in appearance. This is called the Patina. It should not be removed. Since the colour now forms an integral part of the stone surface, it adds to its aesthetic value.

3. Structural conservation treats damage due to natural and man-made factors like sand blowing in a desert, wind, temperature, land slides, earthquakes etc.

4. In Chemical Conservation, various chemicals are used for arresting the deterioration caused by pollution in the atmosphere, action of salt and chemical phenomena such as oxidation, reduction etc. In short the chemical composition of the material is altered. The chemicals used should be capable of being reversed as far as possible though this is rarely the case. Therefore, there is a need to exercise great caution during chemical conservation.

Mode of Execution

At the outset, in 2001 the PWD was decided as the agency to execute the works in view of the large allocation of Rs 5 Crores, which was a historical first. However, they were directed by a government order to execute the works according to archaeological norms. This meant Archaeological Prescriptions as Notes of Inspection had to given by a trained archaeologist, who was confident enough to take responsibility. The works were executed based on the Archaeological Prescription Notes on the pattern of the Archaeological Survey of India (ASI). This pattern was adopted by this writer based on observation of the work done by Thiru K.T. Narasimhan, Superintending Archaeologist of the ASI.

Pre-qualification norms for tenders were fixed. The tenderer should have past experience in the conservation of ancient monuments. The work should be carried out as per archaeological principles. Highly skilled labour, traditional masons skilled in iconography (*stapatis)* / stucco work (*sudai*) masons and special materials should be employed. The aesthetic and archaeological features of the monument should not be affected. This was to enable the identification of the historicity of the monument. Otherwise, all the monuments would become 21st-century monuments. The work had to be inspected at several stages at the discretion of the archaeological engineer, Thiru Chella Pillai, the technical consultant of the department. In addition, the archaeological engineers and archaeologists of the State Department of archaeology also made periodic inspections. Whenever there was a major difficulty, this writer would go in and suggest a way out apart from the usual routine inspections done by him. The first monuments taken up were the Danish Fort at Tranquebar, Manora Tower at Pattukottai, Saraswati Mahal at Thanjavur and the Tirumalai Naik Mahal at Madurai. These were jointly inspected with Thiru K.T.Narasimhan. After learning the initial ropes, then this writer went on to do the work on his own. Looking back in retrospect, the learning curve was probably very short.

Usual Traditional Techniques Common to Monuments

In a monument constructed,with bricks, the sizes of the original bricks should be measured. Bricks of the same size and material only should be procured and used.

Where re-plastering is necessary, it should be done either with the original lime mortar or where additional strength is required with combination mortar. In the latter case, the proportion should be 1:1:5 using lime (sometimes 1:1:3 for greater strength), free from salt and has a high iron content, which is currently available only at Pollachi, as observed by the Archaeological Survey of

India. While using combination mortar, sieve mesh of size Number 12 to get the required fineness of sand maybe used for sieving sand. Extract of gallnut and jaggery in 12 kg. per cu m in equal proposition is also to be added at the time of execution of work. Simultaneously, juice of cactus is also to be added in required consistency as an ingredient for anti saline action. Lime mortar to be used should be well ground. To prevent blistering, the slaked lime stone should be left for 2 to 3 weeks in a heap to stake, be reground and used. The lime mortar should be well cooked so that the plaster is strong.

Using pure cement mortar is strictly banned. This is because cement does not bond with the older material usually lime mortar as it is a heavier material. The plaster using only cement will fall down after a few years. In case it is used on walls to bond bricks or granite stones, cracks may develop soon after the work is done.

All wooden members like joints / beams / windows, doors etc. should be made in Burma Malabar teak wood.

Sand used in the making of mortar should be coarse-grained, perfectly clean, sharp, and preferably of yellow and variegated colour. It should, if possible, be obtained from the local pits or rivers. Sea-Sand contains salt, which will cause efflorescence when the mortar is set. It should not be used in monuments.

During the execution of works, the work will be inspected by the Archaeological Department authorities and instructions issued from time to time have to be followed strictly.

At the time of de-plastering, if any new findings are noticed they should be left as it is till the clearance of the Archaeology Department is obtained.

De-plastering removing worn out bricks should be done carefully, using proper power tools without giving shock to the structures, stage by stage.

While dismantling proper care should be taken to retrieve old materials in good condition as far as possible. This is to enable their reuse as far as possible. It maintains originality as well as saves on cost.

Whenever strengthening / removing / chipping /dismantling are under taken necessary props / strutting should be given wherever required to transfer the load. Sand bags should be used as cushion so that cracks will not develop. This will enable the soft transfer of load. This will free the load on the roof.

Cracks may be caused by injudicious hurry in attempting to lay one coat before the previous one has sufficiently set (but not dry)

How to Tackle Cracks

Testing Method

All cracks and fractures should be the object of periodical inspection Glass "tell-tales" should be placed across all such cracks The size depends upon the width of crack The glass should be ordinary crown glass about 25 mm wide and 15 cm long, secured at either end with a pat of cement leaving the middle clear These "tell-tales" are very important as evidence of settlement, etc This will decide the treatment.

Treatment

Narrow cracks in walls may be filled with lime or combination mortar grout. Wider fissures may be filled with lime or combination mortar concrete

For filling cracks in roofs, lime grout or lime concrete should be used In special circumstances and certain localities water proofing compounds may be used Before filling, cracks or fissures whether in roofs or walls should be well cleaned and watered and the filling materials should be worked deep in to the cracks, and not merely plastered on the outside

Grouting

In ancient structures, hand grouting will be carried out for fear of the collapse of the structure under the expansive force of pressure in pressure grouting

Hand Grouting

In the manually operated machine the pump piston operated sucks the grout from a bucket kept continuously agitated The outlet is connected to a hose with a nozzle at its end.

Pressure Grouting

High pressure grouting is adopted while consolidating the ground under the foundation of a structure This process was adopted in 2002 for the stabilisation of sub soil near the foundation of the Qutub Minar at New Delhi

Plastering

The plaster is a fine paste or mortar made by working with water a mixture of cement and sand or lime and sand or combination mortar Old mortar, though apparently sound, often has a number of small voids behind the outer surface When this is the case, these should be thoroughly exposed and the surface mortar cut out They may be tested by percussion

In pointing the face of the wall, the masons should start at the top and work downwards No pointing of any kind is to be keyed or struck with trowel, but a perfectly flat face be obtained for the joint between each; a rounded or lumpy surface must be avoided.

Where the masonry is uneven and the edge of the stone is recessed some distance (1/2") back from an adjoining stone, the pointing nevertheless, must still remain a flat face.

In ashlars work, the pointing material should be well pressed back with a flat tool, so that the mortar face may be approximately at right angle to the beds of the masonry, in order to avoid feather edge in the mortar

In pointing up very wide joints in masonry, pieces of stone, which roughly fill up the open space, may be inserted These stones should have a weathered face to match the old work All stones inserted in this manner are to have, at least, 100 mm bed

Blistering of Plaster

Blistering is a defect to which internal plastering is subject It takes the form of small patches swelling out beyond the plane of the plastered surface, and is due to the slaking particles of the lime after the plaster has been applied To prevent blistering, the slacked lime should be left for 15-20 days to cool before use and it should be shifted

Filleting

In ancient monuments due to atmosphere conditions, the plastered surface is often damaged The mortar used for edging or filleting is generally of strong composition and contains ingredients like broken brick pieces, stone, coarse sand, gravel etc; First, the basic proportion of lime mortar 1 2 is taken and the various other ingredients as found in the old plaster are added in similar proportion Cement is also mixed with mortar to add strength and depending on the condition of the plaster to be treated If necessary, suitable colours are added to match the original

Efflorescence on Plastered Surface

Efflorescence is the whitish substance that appears on the surface of walls due to the presence of salt in lime, cement, sand and bricks which (salts) are dissolved by moisture drawn through the pores to the surface of the wall, and left in thin layers on evaporation of the moisture It produces damp patches that generally disintegrates the structure. It is normally of a temporary nature, disappearing during wet weather and reappearing during dry weather Efflorescence occurs on both brick and plaster when the place is damp and ill ventilated.

Treatment

Wherever soluble salt, is present in the stone monument it is of the utmost importance to remove it completely. The paper pulp method is used for salt extraction as in the *Amaravati Gallery*.

Dry paper pulp is first soaked in distilled water and the moist pulp is applied on the stone surface to a uniform thickness of about one fourth inch (6 mm), ensuring its close adherence with the surface by gentle tapping with a wooden trowel The pulp is completely dry at the end of the week, it is removed from the stone and tested for the quantity of salt absorbed. The pulp is reused each time testing the paper pulp, until it is found no longer to absorb any salt.

After the complete removal of salt, the stone surface is given a final wash with distilled water.

To avoid efflorescence, well-burnt bricks should be used and clean water (free from salts) should be used

Pointing

Pointing is finishing the mortar joints of the walls (or) similar structure either by lime mortar or cement mortar or combination mortar Generally racking out the joints of stone or brickwork thoroughly and pointing the same with lime or combination mortar is done Lime mortar or combination mortar is to be used for pointing in ancient monuments

In monuments of the pre-Mohammadan period, mortar for plaster was almost unknown. If in their reconstruction or repair its use is unavoidable, it should never be visible on the surface of the masonry or brickwork.

Many temples use a technique called stone on stone as mentioned in our ancient texts like *Mayamata* In this, one stone has the female portion i.e hollow while the other has the male portion i.e projection. Pillars and idols are usually fixed by this method. The fitting is exact. There is no vibration or visible joint. This is the mortar less construction referred to above. This is called Dry Masonry by Westerners, when stone walls are constructed.

Deterioration of Monuments

The causes of deterioration are vegetation in uncared for monuments, atmospheric factors like air pollution as in the case of the Taj or settlement or sand or salt bearing winds as in the case of monuments in Rajasthan and the Shore Temple at Mahabalipuram and cracks due to water.

Chemical Deterioration

a. The effect of atmospheric pollutants like sulphur-di-oxide on marbles is well known.

b. Chemical phenomena such as oxidation, reduction, hydrolysis etc occurring in the rock itself can cause alterations in appearance and weaken the structure.

c. Iron is another factor. It forms rust due to oxidation. These chemical changes involve considerable volume changes, which can cause fracturing of crystallic network.

Growth of Vegetative Organisms

a The growth of moss and lichens often seen on the monuments is the commonest biological agent of deterioration.

b The growth of plants on monuments, the roots sometimes penetrating deeply the masonry work can cause severe damage. They are treated with a Tree Killer developed by the Tamil Nadu Agricultural University or Tuffalo a safe branded chemical and then the hollow filled in.

Man made Factors

The man-made problems to the monuments are religions feuds, vandalism, unawareness, sand blasting in temples, blasting and bombing, encroachments, faulty restoration and repairs to the monument, mismanagement and misuse etc.

Dampness in Buildings

Dampness is also a cause for deterioration of monuments.

Sources

1. Dampness can come down in the form of rain, lake, river, sea, through the holes in the root, broken gutters, windows etc.

2. Dampness can come up from the ground capillary action in to the walls of a building. This is commonly called "Rising damp" and can be seen on buildings to a height of one or two metres.

3. Dampness can also come from condensation. This happens when warm humid air comes into contact with a colder surface and vapour condenses out of the air, in the form of water droplets. In many cases condensation is difficult to document since it usually occurs at a certain time of day or in a certain season or under specific conditions.

Solution

The only complete answer to dampness is water tightening of the roof and other inlets like windows or doors. The drainage has to be strengthened as seen above. Proper ventilation is absolutely necessary.

Air Pollution

Vehicular traffic movement should be away from the monument / archaeological sites. There should be co-ordination between the law enforcing agencies and the Departments of Archaeology and Museums as per as the planning connected with pollution / environment around the monument is concerned. Public awareness should be generated. Sufficient green plantation should be grown around the monuments as they provide oxygen for absorbing atmospheric gases and settling of particulate matter. Construction of high-rise buildings near monuments should be avoided. Markets should be away from the monuments.

Some Important Dos and Don'ts in Conservation of Monuments

It would be wise to follow some of the points mentioned below while conserving monuments. Of course, there should be no blind replication but intelligent choosing of what technique to apply.

1. Any old masonry or other remains buried in the earth should be left untouched unless it is necessary to intervene. *It is agreed as per UNESCO norms that excavation without conservation is vandalism.*

2. Water is the worst enemy of any monument. Since surrounding levels rise in India, drainage by soak pits or connecting to lower level ponds, canals etc is essential. In the Government Museum, Chennai drainage is collected in the water pond in the rear. If this is blocked, the entire complex of buildings will collapse.

3. Proper provision has to be made for drainage, especially for taking off floodwater after heavy rain. Water must not be allowed to stand about in pools or ditches near an ancient monument. Scouring of earth away from their foundations may cause much damage.

4. Differential settlement has affected the National Art Gallery due to the problem of drainage. Similarly, the sculptures in the Amaravati Gallery have been affected. Tirumalai Naik Mahal is another such instance. Therefore, careful provision to prevent any water from rainfall or drainage collecting near the monument has to be done.

5. Struts to support any over-hanging pieces of masonry, fractured door jambs or window lintels, decayed arches should be put in place with a sandbag between the strut and such damaged member where necessary. Any walls or towers, which are in a dangerous state, and are liable to fall down, must be properly shored up with raking shores, needles, soleplates etc. The supports should be periodically examined.

6. Every scrap of evidence that exists in the monument such as broken corbels, string courses, arches etc is to be preserved. They should be reused. In restoration, they should be carefully copied with an inscription of the new date in small letters but visible to the archaeologist of the future. This will tell the story of the restoration.

7. All new evidence brought to light should be reported.

8. In cases where fallen features of a ruined building have to be replaced, a careful survey of the debris has to be done. A stone or other building member will fall to the ground on a spot as near as possible below the position it originally occupied, mostly its place upon the ground will help to indicate its former position. A rough sketch plan of the site should be made on the ground immediately around the base. The individual stones can then be marked according to the area in which they lie.

9. No modern materials should replace old materials as far as possible. In repairing brickwork, bricks of the same size and fabric as the original must be used. The bricks should be laid in the same bond and the mortar joints should be of the same thickness and toned to the same colour as in the old work.

10 Confusion may be caused by the indiscriminate re-erection of images in wrong places

11 They should be re-erected based on clear evidence or reasonable surmise of the archaeologist.

12 Any carved stones or bricks or any pieces of tile work that are found lying in the debris on old sites, should be restored, if possible, to their former positions, provided always that no doubt exists as to what those positions were

13 In all work, care must be taken that the new stonework may match in texture and colour, and may be dressed in the same way as the face immediately adjoining. The joints of the new masonry are to be as inconspicuous as possible, so as to avoid unnecessary contrast with the jointless face of the original face

14 Exposed brick architecture as in the Museum Theatre building or the old Connemara library building must be covered with a layer of proper transparent chemicals like Wacker (Brand name) chemicals to preserve the bricks in the original condition. The original brick surface must be exposed Subsequent layers of colour wash must be scraped away.

15 Similarly, in temples where there is damage to granite or stone sculptures, transparent chemicals like Wacker chemicals to preserve the sculptures must be coated

16 On terrace roofs and domes, old plaster must be maintained in repair in order to keep them water tight In case, new plaster has to be laid, it should be coloured to match, as nearly possible the old work

17 Where pieces of tile work have fallen away, leaving gaps in the surface, the gaps should not be filled with plaster, but with new tiles and plaster leaving no gaps.

18 Combination mortar in the ratio of 1 1:3 may be used for the structural work commonly by mixing the extract of gallnut and jiggery for getting more strength Proportion will vary according to the nature of work If any termites are found an extract of *vilva* {*Aegle marmelos* (L) *correa*} fruit and if saline action is found an extract of cactus may be mixed with mortar as a curative.

19 The internal rafters in the roof or towers as in Manora may be covered with lotus leaf and tied very closely with fine coir rope for getting strict adherence of mortar This also prevents damage to the wooden beam and ensures long life

Termites and White Ants

Damage to buildings etc can only be checked if measures are taken to isolate the building by digging a trench outside the foundation wall and filling it with coal tar and creosote oil White ant infestation may occur in any building constructed at a site infested with these species or which subsequently develop. Buildings with improperly laid foundation, defective construction built with substandard material or damaged by earthquake are susceptible to white ant infestation; use of wood of poor quality for construction work etc also increases possibilities of white ant damage to a building.

If the flooring is felt to have been hollowed, it should be removed at the hollowed places and filled with poisonous chemicals like white arsenic, DDT powder, 1% sodium arsenite in water (or) 5% solution of DDT, dieldrex emulsible concentrate with water, 1 60 (4 5 litres per meter are quite satisfactory for the above treatment) After the treated places become dry, it should be cemented and the flooring relaid. All joints of woodwork in contact with the walls should be painted with creosote oil at least once in six months. Teak should be melamine coated or varnished

Intervention of Animals and Birds

Monuments are usually infested with birds and bats, wire netting screen may be fixed. Sulphur may be burnt inside the chamber. Stretching piano wires across the interior of buildings at intervals about 6 inches is another solution. They have the advantage of being practically invisible.

Cleaning Treatment

Often cleaning the temple or monument of unnecessary layers of subsequently added lime wash or paints is necessary

Lime Wash

A common problem of cleaning that that is seen in our monuments is the removal of lime wash. In our temples, the granite surfaces have been lime washed. This has to be removed by liquid ammonia cleaning and scrubbing with a wire brush. Sandblasting which is often resorted to is a dangerous solution. It will remove the Patina or skin on the granite surfaces and cause cracks to appear leading to destabilisation of the entire temple or monument.

Dusting and Washing of Marbles

Periodic washing is necessary It is important to use water that is free from iron and preferably distilled A little good quality of soap may be used just enough to cause a slight frothing when applied with a soft brush No chemicals should be used as the marble gets discoloured.

General Process for Cleaning and Consolidation with Chemicals (From Narayanan, R, 2003)

Description of affects	Cleaning materials	method of application	Remarks
1 ROCK SURFACE			
a) Entrancing of soluble Salts	Wet paper pulp process		Process to be repeated until the result comes
b) Cleaning dust and dirt	1% lissopol-N (or) 1% teepol in benzene (or) toluene	Brushing with soft nylon brush Thorough rinsing with pure water for final washing	Process to be repeated until the result comes
c) Cleaning oil substance	Acetone (or) 5% Acetic acid in first stage, finally wash it with detergent solution	Brushing with nylon brush	Liquid ammonia is also used
c) Cleaning lime wash	5% Acetic acid solution in first stage and detergent solution in final stage	Apply the solution and allow 15 to 20 min for reaction. Thin scrubbing with soft cow brush till the lime wash is removed Finally it may be washed with detergent solution and plan water	
e) Removing paint from (or) oxide the stone	Caustic soda in hot water	Brushing with soft nylon brush and washed with water	

f) Wall painting in rock surface covered with lime wash	Alcohol with water	By using cotton cloth apply the area for soften the lime. White Wash layer over the painting removal may be made by mechanical means over the area inch by inch slowly.	
g) Wall paintings to remove the dark accretion.	Dill. Solution of formic acid in alcohol.	As above	
h) For eradication of moss and lichens	5% Ammonia with 1% Teepol solution	Scrubbing with soft coir brush and finally washed with water	
For stains in marbles Stone	T-Chloramine	By using cotton for coating. Removal by mechanical means inch by inch	After washing, the surface may be treated with nice talcum powder for porous filling
Consolidation 1) To avoid the possibility of peeling of work (or) To avoid cracking from the plastered surface	Epoxy liquid resin	By injection of liquid through gaps	After this process the surface should be pressed and supported out until the resin dries
2) For filling wide cracks, which are not too deep which do not endanger to the structure	Epoxy putty and epoxy resin mortar	Wide cracks may be filled with epoxy putty particularly and remain with resin mortar	Wacker chemicals have been used with advantage especially to mend damaged granite surfaces
3) For sealing of cracks which are serious	Epoxy liquid resin	Liquid resin should be grouted under pressure with low viscosity	

CHAPTER IV

PRACTICAL APPLICATION OF CONSERVATION AND RESTORATION TECHNIQUES

In this chapter, I narrate the experiences during the course of conservation of various monuments. This is learning from experience, of course with theory as a backdrop. A fool learns from his own experience – a wise man from that of others. The esteemed readers fall in the latter category.

Proeedures to deteet the true nature of problems allowing enough time (Time Consuming)

Repair of monuments is not a quick fix affair, unlike in the case of repair of modern constructions. A period of observing the monuments for one or two months till the monument speaks is necessary as Thiru K.T. Narasimhan puts it. Tell-tale signs have to be fixed in case of cracks e.g. *Devāsraya Mandapa, Tiruvarur*. Excavation has to be done to know the nature of the foundation, e.g. Tranquebar Rampart walls (Kannan, Dr, R, 2003) or know the true levels at the time of construction by taking away the accumulated made up soil and man made layers, e.g. *Tranquebar* Fort foundation, *Madurai Tirumalai Naik Mahal* excavation, excavation for the new building for *Saraswati Mahal* Library, *Thanjavur*.

Use of Proper Materials and Methods

Stitching of walls was done after removal of the artefacts embedded in the walls of the *Amaravati* gallery in 2002. They were removed by using power tools.

The size of bricks during stitching has to conform to the old size. This has been ensured in the *Amaravati* gallery in 2002. Use of such original material has to be ensured by special manufacture and testing.

The exposed brick architecture of the Museum Theatre building was conserved in 2002 by carefully removing about nine layers of red ochre mixed white wash coating. The exposed bricks were safeguarded using Wacker (a German brand) chemicals to prevent future damage. The joints were carefully mended using combination mortar of the same colour as the old red cum brown bricks.

Damage containment due to sandblasting has been done by coating using Wacker type chemicals in many temples e.g. The *Parthasarathy Swamy* temple, *Triplicane* during

Kumbhabishekam in 2003-2004. This will save the granite cladding on temple walls and sculptures. Please refer to the chapter on Sandblasting for more details.

The combination mortar or lime mortar mix prescribed earlier has to be varied in tune with local conditions. *Cactus* juice has to be added as required to combat salinity. Along with proper cooking of the limestone sand mixture, gallnut juice and jaggery have to be added as seen in the archaeological prescriptions made for the monuments. This was ensured during the restoration of the Museum Theatre building in Chennai.

Removal of excess dead load is the proper way of mending and water tightening leaky roofs. Proper quality pressed tiles have to be used for water tightening . This has been done in the *Ramaswamy* Temple, *Kumbakonam*. Use of Bitumen sheets as was done earlier by the PWD adds to load and water getting trapped during the rainy season as in the National Art Gallery building, Museum Theatre building etc. This will endanger the whole structure. In many temples, layers of mortar are added on the roof for water proofing leading to excess dead load.

Other problems encountered are the exact quality of materials is not maintained due to work being carried in many places by different officers and other contemporary factors in the Tendering contract system. Lack of proper cooking of mix for adequate number of days has led to pock marks on plaster. This was noticed in *Tranquebar* Phase II and action taken with a degree of success.

Importance of Drainage

Drainage has been ensured in the case of the Museum Theatre by linking it to rain water harvesting and the pond in the rear. This has been done by linking to the sea in the case of *Tranquebar* Fort.

Need to Adhere to Archaeological Prescriptions

Deviation from notes of inspection as in the *Tirumalai Naik Mahal* where the original level may not have been reached in the courtyard or entrance can create problems of drainage and for the monument in the future.

Where the archaeological prescription is adhered to even if broadly as in the case of the *Ramaswamy* Temple at Kumbakonam, the results can be easily seen. The preservation of stylistic features of this Temple and the provision for drainage into soak pits has made it one of the best preserved temples among the temples for which *Kumbhabishekam* was done during the *Maha Maham* festival, 2004.

When the soil is clayey or ash coloured, before a temple is constructed the foundation is filled with fresh sand. After that, the temple structure is raised. We found this during the course of excavating a trial trench near the National Art Gallery at Chennai and *Vittala* Temple at Vittalapuram. This is in accordance with ancient texts like *Mayamata, Manasara* etc. In the *Vittala* Temple, boulders were used with a sand and lime mortar mix up to a small depth of 3 feet. Now, a plinth beam has been laid without steel. Steel rusts and is avoided in ancient structures. This ensures against uneven settlement.

Another important point noticed is that the foundations of temples are very shallow. At the *Vittala* Temple, the foundation of the sanctum sanctorum was hardly three feet. This was sandy soil near the seashore. Boulders were noticed in the foundation when a trial trench was dug. It was designed to allow subsoil water to flow past smoothly. The shallow foundation does not take away from strength or the capacity of the structure to stand for many hundreds of years, since the whole structure rocks to absorb shocks during natural calamities like earthquakes etc. However, sometimes they do crumble as in Kutch in 2002 during the earthquake.

,Thiru K.T.Narasimhan narrated an international experience. He has worked in Cambodia and Vietnam under UNESCO auspices as part of an ASI team. The mountain of *Maha Meru* he claims is situated 69 km from Da Nang, Vietnam. The mountain is called '*My Son*' in Vietnamese, which translates to beautiful mountain. The temple towers i. e. *gopuras* are shaped like *Meru*. He had a look at the Cham temples. Cham is for *Champa*. There are a lot of Sanskrit stele inscriptions here in Cham script. In the Cham group of temples, which was called dry masonry temples earlier, he found that there was a slight hollow in one oval shaped brick which could receive the projection of the other brick. The joinery was by a paste of a local plant, the fine local river sand and the local spring water. This was not visible outside. This was called Dry Masonry by a Frenchman circa 1920 AD.

The Ta Prohm temple in Siem Reap, Cambodia was built by King *Jayavarman* VII in 1186 AD according to the inscription found here. It is dedicated to his mother '*Rajachudamani*'. It has a very long inscription in Sanskrit in Khmer script (monash.edu /mai/ Sacred Angkor.doc). Thiru Narasimhan made an excavation to show that when the soil is ash coloured it is prohibited soil as per *Manasara*. As stated above, the soil in such a case is replaced at the foundation with fine sand. The theory narrated in the chapter on techniques is thus borne out in practice. This was accepted by UNESCO experts. This is the case with the National Art Gallery building as our excavation of 2003 showed.

During restoration of temples, the granite cladding stones on the walls have to be numbered Then a sketch has to be prepared. Photographs have to be taken to know for future reference where each member was originally This is applicable in the case of old dilapidated temples, e g *Sivapuram*, *Vittalapuram* etc This was actually done as the photographs will show

Repair of stucco figures should be based on old photographic evidence to ensure conformity to the original Otherwise, the original stylistic features will be lost. A 21st Century temple will result.

A case of Red Herring

The identity of the proper original stone has to be established. In the Madras Government Museum, the compound wall and National Art Gallery building was thought of as built of Rajasthan Red Sandstone. Research revealed that it was laterite between seams of gneiss as in Satyavedu. Alexander Rea, a Curator of the 19th Century in the Madras Government Museum has written on the stone, which helped to confirm the writer's research This was news even to an expert like Thiru Narasimhan (please refer to his notes of inspection). The Madras Government Museum compound wall was restored based on the old photographic evidence in respect of designs and stone.

Unique Solutions for Each Monument

While on the subject of removal of excess dead load, the writer noticed that while prescribing for the domes at the entrance of the Tanjore palace for erecting a new building adjacent to the *Saraswathi Mahal*, Thiru Narasimhan did not want the entire dead load to be removed. On questioning, he stated that this was to prevent the collapse of the dome as removal of the entire load will lead to collapse This shows that unique solutions are necessary for each monument Experience and keen observation married to theory alone will prevent disasters like collapse of roofs from taking place

Introduction of modern heavier than traditional members was noticed in *Manora* Tower Concrete beams had replaced teak beams. Cracks started developing. The Tower was in danger of collapse The restoration of originality-concrete beams with teak beams draped in dried lotus leaf bound by thin coir ropes prevented imminent collapse. Another example of excess load was the court building of the 19th Century erected on the roof of the *Tirumalai Naik Mahal*. This was removed gingerly.

The *Tranquebar* fort was a complicated structure Thiru Narasimhan and yours truly had to spend four to five hours on the roof in this fort in order to understand the monument It was found that there was immediate need for conserving the monument. The fort is in North-South orientation with doors at the East for ingress and a veranda on the West Thiru. Narasimhan found that there was a unique architectural feature in the monument. The central portion of the fort had four camel hump shaped domes on the roof with tie rods functioning as stays. The entire load of the domes was transferred on to a central pillar in the hall Tie-rods have been used, as brick pinning alone would not serve the purpose since the domes are rectangular in shape and of very large size The northern and southern portions had barrel vaulted roofs These had cracked in the central portion of the vaulted portions The crack was longitudinal along the entire roof Plastering on the roof and the walls had peeled off. This exposed the inner core of bricks to nature The wooden frames of the windows and doors had rotted due to exposure to 100% humidity since the fort is abutting the sea. Monsoon rainwater sprays into the interior, since no sunshades had been provided in the original construction Due to leakage in the roof and also due to a hole in the load-bearing wall on the western side, water poured into the core of the walls This was the condition of the fort during the inspection Thiru K.T.Narasimhan gave a note of inspection suggesting the immediate repairs to be undertaken and the lines on which repair is to be carried out The successful carrying out of the repairs in 2002 made us heave a sigh of relief For the second stage, yours truly gave a note (See Chapter V) after excavation

Timely Intervention

Our timely intervention has saved at least a couple of monuments like the Danish Fort at *Tranquebar*, the *Manora* Tower etc It has probably resulted in saving the roof of the *Tirumalai Naik* Mahal, since the dead load on the roof by way of a 19th-century construction was removed. Where intervention has not occurred as in the case of the *Mastlamaninatha* temple on the sea shore at Tranquebar, the results have been sad They have been lost

Interesting Experience – the need to know Ancient Texts

We expected to find a well in the north east corner of the *Vittala* Temple, which was covered by soil When conservation was started, an excavation was made Lo and behold, there was a well! This is as per the ancient *Manasara* and other texts A similar experience occurred in the basement of the fort at Tranquebar Please refer to Chapter-V, Archaeological Prescription, when an ancient drainage as per the Archaeological Prescription of this writer was discovered after excavation Also, the temple at Ta Bohm and National Art Gallery are other instances

CHAPTER V

INSPECTION NOTES AND ARCHAEOLOGICAL PRESCRIPTIONS

INDEX

Sl.No	Date	Subject	P.No.
1	06.10.2002	*Chinnayankulam* (Stepped Tank),Chinnayanpettai , by Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	101
2.	17.07.2001	Inspection Note of Thiru. K.T. Narasimhan, Superintending Archaeologist, ASI on *Dansborg* Castle, *Tranquebar*	104
3.	08.10.2002	Inspection Note of Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums on *Dansborg* Castle, *Tranquebar*	105
4.	03.08.2003	Inspection Note on *Dansborg* Castle, *Tranquebar* by Dr. R. Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums	109
5.	18.07.2001	Inspection Note on *Manora* at *Sarabendrarajapattinam*, *Thanjavur*, District by Dr. R. Kannan, I.A.S., Commissioner of Archaeology and Museums	127
6.	07.10.2002	Inspection Note on *Manora* at *Sarabendrarajapattinam*, *Thanjavur*, District by Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	129
7.	04.08.2003	Inspection Note of Thiru. M.G.Chellapillai, Archaeological Consultant on *Manora* Monument.	131
8.	03.08.2003	Letter to the Special Commissioner, HR and CE on *Tranquebar, Masilamaninathar* Temple by Dr. R. Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums	132
9.	17.08.2001	Report prepared for the Conservation of *Ramalingavilasam Palace*, *Ramnad* by Archaeological Officer, Madurai under dictation by Dr. R. Kannan, I.A.S., Commissioner of Archaeology and Museums	133
10.	05.10.2002	*Siva* Temple, *Sivapuram*, Kanchipuram by Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	134
11.	08.10.2002	*Sri Naganathaswamy* temple, *Manampadi*, Thanjavur District, by Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	137
12.	04.08.2003	*Sri Ramasamy* Temple, *Kumbakonam*, Thanjavur District, by Dr.R.Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums	138
13.	07.10.2002	*Swastik* Stepped Tank, *Thiruvallarai*, Trichy District, by Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	140
14.	05.08.2003	Comments on the estimate for the conservation works of *Swastik* Stepped Tank, *Tiruvallarai*, Trichy District by Thiru. M.G.Chellapillai, Archaeological Technical Consultant	142
15.	08.10.2002	*Thanjavur* Palace Buildings, *Thanjavur*, by Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	159
16.	20.08.2001	*Tirumalai Naik Mahal*, *Madurai* (Inspection Notes, report submitted by the Archaeological Officer, Madurai) under dictation of Dr.R.Kannan, I.A.S., Commissioner of Archaeology and Museums	160

17.	20.08.2001	*Tirumalai Naik Mahal, Madurai* (Report submitted by the Assistant Engineer, Madurai)	162
18.	01.10.2002	*Tirumalai Naik Mahal, Madurai* –Description of works to be carried out in order of priority.	167
19.	13.08.2003	*Tirumalai Naik Mahal, Madurai*, by Dr.R Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums	168
20.	14.08.2003	*T.N. Mandapam, Alagarkoil, Madurai*, by Dr.R Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums.	170
21.	08.10.2002	*Giant Granary* at *Thirupalaithurai* Village, Thanjavur District, by Dr.R Kannan, I.A.S., Commissioner of Archaeology and Museums	172
22.	04.08.2003	*Giant Granary*, at *Thirupalaithurai* Village, Thanjavur District, by Dr.R.Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums	191
23.	18.07.2001	*Udayagiri* Fort and *De-Lanoys* Tomb, Kanyakumari District by Dr.R Kannan, I.A.S., Commissioner of Archaeology and Museums	192
24.	29.08.2003	*De-Lanoy's* Tomb and Udayagiri Fort, Kanyakumari District by Dr.R.Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums.	193
25.	01.08.2003	*Vittala* Koil at *Vittalapuram* by Dr.R.Kannan, I.A.S., Commissioner of Agriculture, Archaeology and Museums	196
26.	18.03.2002	*Vettuvankoil* and Samanar Abode (Inspection report submitted by the Archaeological Officer, Tirunelveli) under dictation by Dr.R Kannan, I.A.S., Commissioner of Archaeology and Museums	198

V - INSPECTION NOTES AND ARCHAEOLOGICAL PRESCRIPTIONS

Name of the Monument: *Chinnayan Kulam* (Stepped Tank) at *Chinnayyanpettai* near Tanippadi in Chengam Taluk, Tiruvannamalai District

The monument was inspected by Dr. R. Kannan, IAS., Commissioner of Archaeology and Museums along with Assistant Director (i/c), Archaeology, Assistant Executive Engineers of Archaeology and Public Works Department on 6.10.2002 at 10.00 A.M. The State Government have allocated a sum of Rs 3.70 Lakhs under the XI Finance Commission grants.

This stepped tank belongs to the 17th Century AD and the period is ascertained from the style of sculptures in the steps and inner parapet wall of ashlars stone masonry. Due to age and exposure to nature, the tank steps and parapet walls are dislodged from their original positions. There are beautiful sculptures in Hoysala style. This is like a mini Khajuraho and it denotes that *Dharma, Artha, Kama, Moksha*, the four-fold path of Hinduism is an integral way of life. Therefore, sex has its own place and is not dirty, except when inappropriate. In some places, the sculptures have been eroded. There are a lot of erotic sculptures, also there are sculptures of animals, day to day life, signs of the Zodiac and war scenes etc. Below the wall there is one broad step followed by smaller steps. The dimensions are 4 feet for the broad step followed by a step of one foot and four numbers of steps of 8 inches each. Then there is a three feet broad step followed by four numbers of eight inch steps. The rest of the steps are under water and not visible. There are engraved sculptures on the side of the steps just above the second three-foot step. Since there is water, further problems can be ascertained only after pumping out the water in the dry season beginning March. An outlet is on the western side above the second three-foot step. The inlet may be at the bottom it can be surmised, but the source is not visible at present. Local people spoil the water by washing, bathing and misusing as drying yard for clothes. This should be prevented.

This is a special nature of work. It is not possible to executive the work without the help of archaeologists. Adequate Fund of TA and DA for this work is not available in this department. Hence necessary provisions for the inspection and the guidance for the works may be added in the estimate as Consultancy charges. Still it will be a fraction of the reported cost of Rs.80,000/- charged by an agency for the *Tiruvatteeswaran* temple *Tiruvatteeswaranpettai*, North Chennai.

Immediately it is not possible to execute the work in this monsoon period and hence it should wait till the summer i.e. March onwards. However, the following works may be taken up prior to monsoon.

1. Enamel protection Notice Board and Information Board as per the Archaeological Survey of India standard should be erected. The information will be furnished by Thiru Chandramoorthy of the State Department of Archaeology.

2. The existing barbed wire fencing and MS angle posts are worn out. Hence the approved RCC post design of Archaeological Survey of India has to be provided and kept ready. The boxes for this will be made available by the State Department of Archaeology.

3. Trial trenches to verify the depth of the parapet wall may be dug in two or three places at the central portion of the parapet (Dimensions of the trench - 4 feet x 4 feet x 5 feet).

4. One or two dislocated stone slabs may be removed carefully to find out whether they are adhering by means of brick jelly with lime mortar on the inside next to the earth. This is the usual pattern in Vijayanagar stepped tanks according to Thiru K.T. Narasimhan, whom I consulted. He has done a similar work in the *Kalyana Mahal* at *Gingee*. I saw a similar stepped tank in Hampi. However, this has to be verified as above. No grooved slabs are usually used. It appears to be dressed stone packing without mortar at first sight. The last slabs are of laterite up to the first 3 foot slab from the bottom. This as to be tested as stated above.

5. The documentation with digital camera has to be done at each stage of the work. It may be recorded in CD immediately through the archaeology department. Finally one hard copy album has to prepared of the important photographs.

The following other works may be taken up after the monsoon. The works may be done departmentally as far as possible.

1. The dislocated steps are to be removed carefully after the documentation and numbered with the help of this department. Draughtsman's sketch has to be prepared.

2. Ashlars stone slabs are to be replaced by dressing without spoiling the adjacent steps.

3. While removing the dislodged Ashlars stone, proper care should be taken to retrieve the existing material in good condition.

4. Documentation at each stage as per the Archaeological principles should be done to avoid and counter criticism.

5. Resetting also should be made very carefully without spoiling its aesthetic value by utilizing the services of the Department *Stapathy*.

6. The sculptures found in the tank may be chemically washed and protective coating may also be provided for avoiding its further deterioration by utilizing the services of the departmental chemist.

7 One shed for housing the materials may be constructed.

8 Earthwork excavation may be carried out all around the stepped tank to bring out the interned portion of the parapet wall.

9 Some sculptures like the twin *Nandi* joined with a single head found in the corners of the tank are headless or vandalized in other respects. They may be suitably dealt with according to the principles of conservation in consultation with the Department of Archaeology.

10 Vegetation growth found with in the fencing may be removed. Suitable lawn grass *(Cynodon dactylon)* may be planted.

11 Barbed wire fencing with two ply 12x12 gauge G1 barbed wire may be provided.

12 For easy access of inspection and avoiding erosion of the parapet wall necessary RCC pre-cast slabs may be provided all around the tank, about 1-meter breadth may be provided as apron.

13 Necessary provisions may also be made for removing the earth and blocks from the inlet and outlet of the tank till the nearby channel.

14 If base layers of the steps are to be provided with brick jelly, proportion of 1:1:3 combination mortar may be used. Lime should be free from salt, which is available from Pollachi. The standards observed by Archaeological Survey of India may be used. Required zeera of gallnut and jaggery in 12 Kg per cubic meter in equal proportion is to be added at the time of works. This is not a standard formula. It will be varied for other works in other places.

Dr.R.Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Government Museum,
Chennai-600 008.
Camp at Tiruvannamalai.

Sl. No. 2

Name of the Monument : *Dansborg* castle at *Tranquebar* in Poraiyar Taluk, Nagapattinam District

No.4/2/Pon/78/M/2763/23.7.2001.

Inspection Note of Shri K.T.Narasimhan, Superintending Archaeologist, Archaeological Survey of India, Chennai Circle, Chennai-9

Name of the Monument	:	*Dansborg, Tranquebar*, Nagapattinam District
Date of Inspection	:	17.7.2001.

A joint inspection was made by me along with Dr.R.Kannan, I.A.S., Commissioner, Govt. Museums and i/c of Department of Archaeology, Govt. of Tamil Nadu and Shri Sudip Jain, I.A.S., District Collector, Nagapattinam District.

This fort is facing east, having flight of steps to reach the hall. The fort is running North-South orientation having vaulted roof. It appears that the present floor level was raised. It is evident from the fact that the lime plastered arches are not having at least 4 feet height, which shows the original level might have been different and the present floor level was raised.

The fort structurally seems to be in good condition, but heavily damaged due to age and weathering. Though originally lime was used for plastering subsequently cement was used. This fact can be seen because still few patches of lime plaster exist even today. The core is affected wherever the plaster has gone. It is not possible to visualize the actual extent of damage to the wall unless and otherwise it is deplastered.

The conservation measures are recommended as under.

1) Deplastering the exterior as well as the interior walls.
2) Deplastering of interior portion of the dome (vaulted roof).
3) Pinning /grouting/filleting wherever necessary to get even surface of the wall.
4) Thorough washing of the entire surface (Deplastered surface) with sweet water. This is necessary to desaline the entire wall surface.
5) Plastering with combination mortar.
6) Reproduction of cornice, pilaster and other architectural decorations.

7) Replacement of wooden windows

8) Providing cross bars to the windows with S.S. (Stainless Steel) Rods

9) In this fort the central portion has got a high roof in the form of 4 domes with a pillar at the centre. On physical examination it is found that since the domes are rectangular in shape, mere brick pinning will not serve the purpose, that is why the tie-rod is used on four sides up to the wall as well as centre masonry pillar. The idea is to transfer the load over the central pillar.

Therefore, it is not possible to suggest the conservation measure without deplastering the dome and physical examination of the given iron rod. It is also clear that the tie-rod is used in East-West orientation separately for each dome. Its condition also has to be probed before executing the conservation work. Hence, as far as water tightening of the roof is concerned special care has to be taken; otherwise the entire thing may come down within no time.

(K.T.Narasimhan)
Superintending Archaeologist

Sl. No. 3

Name of the Monument: *Dansborg* castle at *Tranquebar* in Poraiyar Taluk, Nagapattinam District

The State Government have allocated a sum of Rs.3.15 Lakhs under the XI Finance Commission grants. The state government protected monument of *Dansborg* caste at *Tranquebar* was inspected by the Commissioner of Archaeology and Museums along with the Executive Engineer, PWD, *Nagapattinam* and *Thanjavur* on 8.10.2002. The estimate prepared by the Executive Engineer, *Nagapattinam* was not given in advance and it was perused only casually at the site. It is observed that the bricks at site purchased through the Archaeology are not included in this estimate. The process of excavating the foundation and construction of super structure was explained to the Executive Engineer concerned at the site itself. Hence the estimate may be prepared using the bricks available at site.

A trial trench has already been dug abutting the fallen down portion of the rampart wall. It has shown two offsets up to a certain level and one more level up to virgin soil. The report of the Archaeologist Thiru Subramanian who conducted the excavation with photographs before the pit was closed to prevent further caving in of the wall due to monsoon may be seen by the E.E.

1. The existing earth of the caved in portion is likely to yield a lot of old bricks. These can be reused wherever possible. This will reduce cost of materials.

2. Stitching of the new bricks to the old wall bas to be done very carefully using a well ground combination of mortar with a proportion of 1:1 3 using lime free salt which is available only at *Pollachi* as sourced by ASI. The existing bricks on site may be used for the offsets on the northern side of the wall as per existing archaeological evidence.

3. While using combination mortar No 12 sieve mesh may be utilised for screening the sand to get nice sand. Scrum of Gallnut and Jaggery in 15 kg. Per cubic metre in equal proportion is also to be added at the time of work. Some cactus juice may be added since it is close to the sea.

4. It may be necessary to go down up to the level of the last two offsets. It may not be necessary to go down to virgin soil as the portion above it is well stabilised for more than two hundred years.

5. The gate of the castle may be made with teak wood reapers strung together on a teak wood frame on the inner side. This will give the same look and construction as a 17th century AD European castle, which is what it looks like in old pictures and drawings.

6. The weathering course of the arch above the entrance has too many layers resulting in unnecessary head load. The superfluous layers may be removed and water tightening may be done. The removal may be done by a power tool (chipper) to ensure minimum vibration.

7. There is dampness in the vaulted basement portion of the main building of the fort. It is likely that there will be savings due to using the excavated old bricks and the bricks bought and stocked by the State Department of Archaeology a few years ago. These may be utilised for digging a trial trench in the basement (vault) of the main fort structure. This trial trench should be dug under archaeological supervision to avoid the possibility of damage to the foundation. This will help to find out the ancient drainage and foundation details of the main structure on the western side. The trial trench may be dug at the central portion of the wall sides and not near the pillars to avoid any destabilisation of the ancient structure.

On completion of the above process, we may come to some conclusions on the nature of the rectification work required.

The Government has again sanctioned Rs.35.00 Lakhs for the *Dansborg* Castle for repair works vide G.O No.232, Tamil Development Culture and Charitable Endowments

Department,dated 25.9.2002 for the financial year of 2002-2003. For these works, the Inspection Notes of Shri K.T. Narasimhan, Archaeological Survey of India given after careful study of the structure in July,2001 itself was given on the spot by the Commissioner of Archaeology to the Executive Engineer, *Nagapattinam*. It is further instructed that the works identified by him especially the structural work to save the fort main building should be given top priority.

The works identified in addition to those identified by Shri K.T. Narasimhan, Archaeological Survey of India are listed below. These are to be carried out per Archaeological principles. The quality of work should be on par with what has been done on the Old Governor's Residence portion of the castle, which is roughly half the castle main building in 2002.

These are:

1. If any problem is detected by the trial trench in the basement, necessary provision has to be made for excavating the outer sidewall and footing/grouting should be done, so that future problems will not arise.

2. The enamel protection notice board, Information Board and Name Board as per A.S.I. standard should be erected at the frontage without affecting its view. The matter to be written will be furnished by the Department of Archaeology.

3. Water tank and lavatory found in the inner buildings should be dismantled for reducing its dead load and water seepage. No such structure was contemplated in the original structure as can be seen in the drawings of the period. A Sintex tank can be provided at an appropriate place where the load is completely transferred to the load bearing main wall. This will avoid strain on structures not meant to take such a load.

4. The dummy iron rod found in the inner room for hanging a fan may be removed from the vaulted dome as was done during repairs in the southern side.

5. 1'-00" x 1'x00" hand dressed granite tiled flooring as existing in the main room at present may be provided after removing the cement floors in the halls to the original level.

6. Three numbers of septic tank found in the open yard may be removed with drainage line. They may be the cause for the dampness in the basement.

7. Proper drainage arrangement may be given for draining the water away from the complex, in the unlikely event of no ancient drainage being found.

8. The existing lavatory in the open yard near the southwest corner of the fort wall may be modified with facilities by providing suitable roof but without spoiling the original face of the structure. A sealed septic tank may be provided there so that water does not leak and seep into the surrounding ground. It should be emptied every month.

9. The front face of the rampart wall has longitudinal cracks in some places. These should be rectified by stitching, grouting, filleting the brick wall as appropriate.

10. Outer drain from the rampart passage platform may also be provided by linking to the drain contemplated above without changing its aesthetic appearance.

11. De-plastering and re-plastering with combination mortar 1:1:3 may be carried out on the outer face of the front rampart wall, in places where there is no damage mere chemical cleaning is sufficient.

12. The inner and outer portion of the walls of the halls should be plastered with combination mortar and traditional mortar as has been done in the adjacent rooms of the southern side in 2002.

13. Doors, windows etc. may be replaced with teakwood and polished with melamine as has been done earlier this year. The wicket gate leading to the sea on the front side may be repaired providing locking arrangements.

14. The small gateway in the eastern side may also be provided with stainless steel rods as suggested by the ASI.

15. Steps to the seaside are also to be repaired suitably.

16. Documentation at each stage as per the Archaeological principles should be done to counter criticism.

The works can be expected to cost not more than Rs.10-15 Lakhs based on the past experience of conserving and renovating the southern portion earlier this year. The excess amount can be diverted to other monuments in urgent need of repair.

Dr R.Kannan,Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl. No. 4

Name of the Monument : *Dansbarg* castle at *Tranquebar* in Poraiyar Taluk, Nagapattinam District

Dansborg castle at *Tranquebar* was inspected on 3/8/2003 along with District Collector of *Nagapattinam*, Thiru. M.G.Chellapillai, Archaeological Technical Consultant and Spl. Gr. Jr.Engineer (H.Q) of this department

1.Reconstruction of damaged Fort wall at Tranquebar- Estimate Rs. 3.15 Lakhs

The design of the entrance gate for the castle does not suit the requirement. The design is to be revised as per the instructions of the Commissioner at the site inspection and to be sent to Executive Engineer, PWD, *Nagapattinam* for preparing the gate and fixing the same. Design is enclosed.

Several running cracks were found on the outer vaulted roof of the castle due to the improper mixing of plastering materials. It may also due to over thickness of the plastering. This should be rectified by applying thin wash coat of combination mortar 1:1:5.

2. Restoration of Danish Fort at Tranquebar – Estimate Rs.35 Lakhs

In my earlier inspection note dt. 8.10.2002, I have pointed out that a trial trench may be dug with the help of District Archaeological Officer *Thanjavur* at the central portion at the basement, on the wall sides before coming to any conclusion of the nature of work to be carried out at this monument. But this has not been done. This will also determine why there is dampness at the base. Water may have to be drained out. An estimate for Rs. 35.00 Lakhs has been prepared by the PWD.

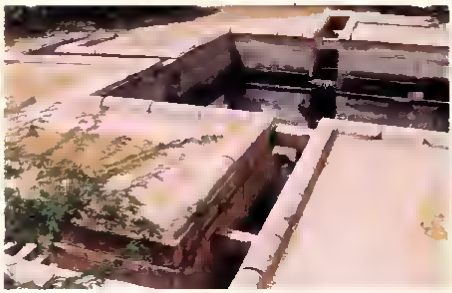
Similarly I have particularly pointed out the deplastering and re-plastering of the face of rampart walls have to be carried out only at the worn out / cracked portions. Deplastering except in damaged portions should be stopped at once. But the estimate shows that the entire portion of the wall has to be de-plastered and re-plastered. This will result in unnecessary expenditure and hence this work should be carried out only at the places of the worn out/ cracked portion. The savings if any due to this should be utilized for some other needy works with the approval and consent of the Commissioner of Archaeology, Agriculture and Museums.

The present drain pipes have been damaged at the wall Due to this water flows through the wall. Moss and lichen are formed To avoid this spout with the projection may be provided

Water leakage from the roof has to be examined. Water repellent (Wacker Chemicals) has to be used to prevent dampness on the roof and side walls It is seen in some of the showcases lighting is not properly provided Dichroic lighting is to be provided in the show cases The Curator is to take proper action in this regard Similarly fused bulbs have to be replaced wherever necessary and the expenditures met out of office contingencies

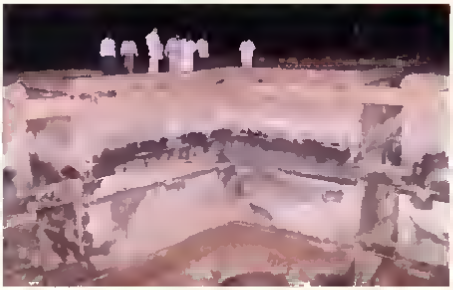
Dr R. Kannan, Ph.D., I.A.S.,
Commissioner of Agriculture,
Archaeology and Museums

Swasthik Tank - *Tiruvellarai*



Swasthik Tank - Before conservation

Swasthik Tank steps - Before conservation



Swasthik tank - During inspection by Dr R Kannan

Swasthik Tank - After partial conservation

Swasthik Tank - Swasthik view

Thanjavur Palace - *Thanjavur* District

Portion of *Thanjavur* Palace - *Naik Mandaps* - Before conservation

Naik Mandaps at *Thanjavur* Palace - Before conservation

Thanjavur Palace - *Thanjavur* District

Inner view of
Naik Mandapa,
Thanjavur Palace
- Before conservation

Naik Mandapa pillars
- After conservation

COLOUR PLATE - XX

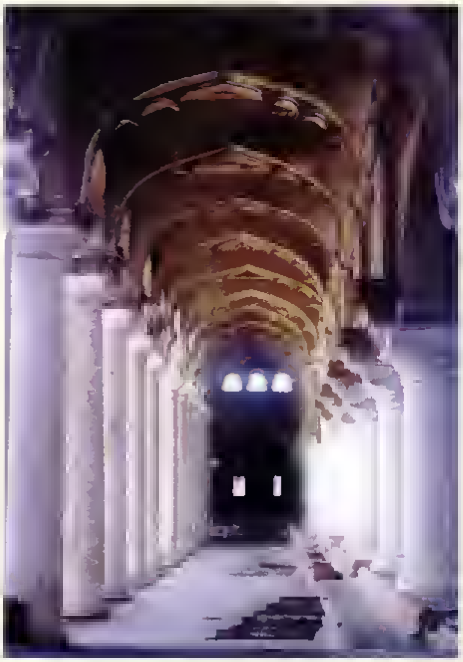
Thanjavur Palace - *Thanjavur* District

Dr. R. Kannan, inspecting the conserved *Thanjavur* Palace

Full view of *Thanjavur* Palace- After conservation (1994)

Tirumalai Naik Mahal (Palace) - *Madurai*

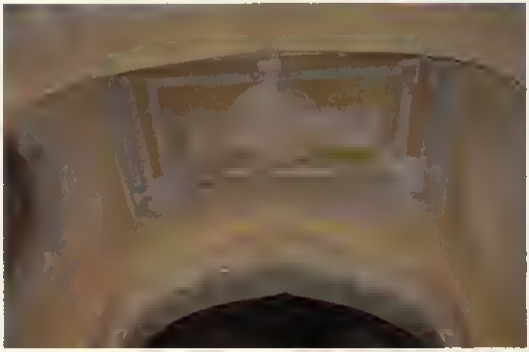
Side view of
Tirumalai Naik Mahal
- Before conservation
Inspection by
Dr.R Kannan, Commissioner



Some Pillars at
Tirumalai Naik Mahal
- Before conservation

Tirumalai Naik Mahal (Palace) - *Madurai*

Tirumalai Naik Mahal Pillars
- Before conservation



Tirumalai Naik Mahal Roof
- During conservation

Dr. R. Kannan inspects massive pillars of *Tirumalai Naik Mahal*
- After conservation

Tirumalai Naik Mahal (Palace) - *Madurai*

On the Roof of *Tirumalai Naik Mahal* - After conservation

Side view of *Tirumalai Naik Mahal* – After conservation

Tirumalai Naik Mahal (Palace) - *Madurai*

Tirumalai Naik Mahal general view (*Brahmasthana* - Court yard)

Tirumalai Naik Mahal Under Illumination

Sl No 5

MANORA TOWER MONUMENT

The Inspection report of the Manora Monument was prepared by the Commissioner of Archaeology and Museums, Dr R. Kannan, IAS along with Thiru. K.T. Narasimhan, Superintending Archaeologist, Archaeological Survey of India, Chennai Circle.

Name of the Monument	***Manora Tower***
Place	***Pattukottai, Thanjavur District.***
Date of Inspection	**18.07.2001**

The *Manora* Tower is a Monument at *Pattukotai* Taluk of *Thanjavur* district. It is built on the beaches of *Sarabendrajapattinam*, which is 13 Kilometres from *Pattukottai*. The Second *Saraboji* (*Serfoji*), the Maratha king of *Thanjavur*, built this during 1814 AD.

This 9 storied hexagonal shaped building is 75 feet tall (22.3 meters). A moat and a compound wall surround this. The *Manora* Tower resembling a fort has also served as a lighthouse.

The brick floor of this monument and internal verandahs are at present fully damaged by having lot of broken bricks with many undulations. Water stagnation expected during the rainy seasons may aggravate further the existing damages as well as create some more damage. In order to avoid further damage the following precautionary measures may be taken up as enumerated below.

The damaged flooring needs to be repaired by removing all the damaged bricks from the floor and replace them with new ones. For this, the Bricks available at *Tarangampadi* (*Tranquebar*) may be used. While laying down new bricks the inter spaces in-between the bricks may be filled with Lime Mixture/Mortar prepared in the ratio of 1:1:5.

The floors of the first two storeys of the building are having lot of undulations. Due to these ups and downs, the damage is worsening day by day. Hence an early repair and maintenance of the floor is essential.

The defective broken bricks removed from the floors may be further broken down into gravel to fill the pits as well as the lime Mixture/Mortar with the ratio of 1:1:5 may be used to plaster the filled in pits on the footsteps and floor with the brick gravel.

There are many broken bricks in the steps leading to the upper stories and damage is noticed on the steps as well. The undamaged bricks to be removed while repairing the floors may be re utilized as the size of the bricks used are the same for the floor as well for the steps. The ratio of 1:1:5 may be adopted while preparing the lime mixture/mortar for the repair purposes. Juice of aloe vera, jaggery and galinut may be used. Aloe vera (Cactus) juice is essential to combat salinity as it is on the west.

The wooden beams in the ceiling of the balcony that was built earlier have been replaced with cement beams in the name of repair. It may be due to the increased weight of the cement beams which has led to three cracks in the ceiling as well one on the lower side of the wall. It is ideal to

replace the cement beams with teak wood beams without causing any further damage to the sidewall as well as to the ceiling. This replacement would prevent formation of new cracks as well minimizing of the widening of the existing ones. The lime mixture/Mortar with the ratio of 1:1:5 may be used for re-plastering purposes as above. The new teak beams are to be wrapped in dried lotus leaf. Then they have to be wrapped with side ply coir ropes again. After this they should be inserted into the slot meant for them after removing the concrete beams. This is a delicate operation.

The roof of the floors above and the steps surrounding the beams has to be supported to prop with a soft cushion of gunny and steel plates so that the entire top of the tower does not collapse.

Re-plastering is needed to avoid further cracking. The surface of the walls is to be scraped depending upon the depth and length of the cracks. The plastering of the Compound wall is withered and the bricks are being exposed externally. There is every possibility for further damage when water penetrates into the walls. Hence the surface of the compound wall warrants protection.

While clearing the walls and the algae growths on the wall, they are to be removed with the help of a minute metal brush. Then the wall needs to be cleaned thoroughly with water. Then only the plastering has to be done with the lime mixture/mortar of 1:1:5 ratio. Aloe vera, jaggery and gall nut serum has to be added.

There is an inlet and an outlet pipe like provision provided in the moat but at present they are being blocked with sand. The sand is to be removed and the pipes repaired for their functionality to be restored. The sides of the compound walls are also having a lot of sand deposits. After removal of the same, the old method adopted in maintaining water in the moat could be examined and studied. Two bigger unbreakable pipes may be attached to the inlet as well the outlet at a distance 10 meter for the flow of water. Such measures may protect the moat to a greater extent.

The *Manora* monument is at present white washed. But this has been washed out in a lot of places. This makes us feel that look of the monument has been changed. In North India, the Minars are being painted with yellow ochre colour. It is better to repaint the *Manora* Tower with distemper berry with the yellow ochre colour to be bought from M/s. Four Square. While painting, the distemper has to be mixed with Fevicol for better adhesion.

Wooden steps as well as a pathway have been provided to reach the top. Without removing the wooden steps, the entrance of the pathway has to be closed with an iron grill door. This door should be installed in such a way that its opening and closing are easy. A latch with a lock and key may be provided for the door so that the door may be kept open or closed as per need.

(Dr. R. Kannan, Ph.D., I.A.S.)
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

(This note was the final hand holding by Thiru. Narasimhan. After this, I prepared notes on my own).

Sl No 6

Name of the Monument: *Manora* at *Sarabendrarajapattinam* in Pattukottai Taluk, Thanjavur District

The monument was inspected by the Commissioner of Archaeology and Museum along with Executive Engineer, Public Works Department (Buildings), *Thanjavur* and Asst. Executive Engineer, PWD, *Pattukottai* on 7.10.2002. The State Government have allocated a sum of Rs 3.78 Lakhs under the XI Finance Commission grants.

Manora belongs to the 19th Century A.D. It was constructed by the Maratha King, *Serfoji* II. On perusing the estimate prepared by the PWD, the priority of works has not been followed according to the monument's condition. Hence revised estimate may be prepared for the following repair works according to the following priority

1. The pre-cast RCC beams provided by the PWD in the previous round of repairs at the tower near the top are found cracked as predicted by Thiru. K.T.Narasimhan, S.A. of ASI during the previous inspection along with me in July, 2001, when he explained the structure to me

2. The joists may be replaced by seasoned teakwood rafters covered with good quality of coir rope purchased through the Coir Board of India for good adherence of the mortar. The rope should be wound round the joist.

3. This work should be carried out without damaging the sides since the space for movement is less. However, before executing the above process necessary props and struts to fit flush with the gaps in the ceiling within the joists should be provided

4. The joists should be plastered with combination mortar to avoid exposing the rafter and coir rope. After the work is over, the load should be gradually placed on the beam while watching for any sign of stress

5. Simultaneously, the pre-cast lintel provided at each floor may be removed and the above process is to be repeated till only wooden joists are in place on all the floors.

6. Cement plastering wrongly used in the inner and outer walls of *Manora* in the last round of repair by the PWD may de-plastered. Removal should be done by a proper power tool (chipper) without administering shocks to the structure

7. If any crack is found on the surface of the wall, it may be injected with combination mortar slurry or properly grouted

8. Re-plastering may be made with combination mortar with a proportion of 1:1:3 using

lime free from salt which is available only at *Pollachi* (as sourced by ASI). While using combination mortar No.12 sieve mesh may be utilised to sieve and screen sand. Zeera of gallnut and Jaggery in 12 Kg. per cubic metre in equal proportion is also to be added at the time of work. Simultaneously juice of Cactus (*Aloe vera*) is also to be added for its required consistency as medicine for anti-saline action.

9. Pot holes found in the inner flooring and steps are to be rectified by using brick jelly lime mix with combination mortar finishing or lime mortar finishing.

10. The white washed layers over the ashlars stone masonry works may be chemically washed and protective coating may also be applied for avoiding its further deterioration by utilising the services of departmental chemists.

11. The brick flooring at ground floor all-round the pillar and moat is found damaged. This may be rectified by adopting the same size of bricks with combination mortar without raising its original level.

12. While dismantling, proper care should taken to retrieve the old materials in as good a condition as far as possible.

13. Necessary provision may also be made for removing the earth and blockage from the inlet and outlet of the moat to facilitate the entry of the nearby sea back water as prevailed in ancient times.

14. The wicket gate entry of third floor may be replaced by teak wood planks with necessary locking arrangements. A teak door with leaves can also be provided at the main entrance with necessary locking arrangements.

15. Partition wall constructed on the moat may also be removed using proper power tool and debris is also to be removed.

16. The earth has to be excavated till the old channel links up with the sea as prevailed earlier. E E PWD may get the funds from the Collector who has agreed to fund it.

17. The outer portion of *Manora* may be colour washed with "Four Square" brand of ochre colour distemper with Fevicol. This method is adopted in North India minars according to Thiru. K.T. Narasimhan whom I consulted.

18. The works should be carried out as per archaeological norms. Therefore, the rates for ASI for highly skilled labour like *Stapathy* and special materials may be adopted.

19. This work is a special nature of work. It is not possible to executive the work

without the help of Archaeologists. Hence necessary provision for the inspection and guidance for the work may be added in the estimate

20 During my inspection it is heard that the people who visited the *Manora* are staying for 2 to 3 hours and vandalising it. The charges should be Rs.10 per person and Two dollars in the case of foreigners for climbing up the structure and normal entry fee should be Rs 5/- and One dollar for mere entry. Necessary approval of the Government may be obtained.

21. Enamel Protection Notice Board as per ASI standard having a size of 1 Mtr x 0.5 Mtr. should be erected at the frontage. The matter to be written will be furnished by the Department of Archaeology.

22. The English version in the information board kept at the frontage of Manora may be corrected as follows. "as" is to be inserted before the word 'of a good example' (i.e second line third para)

23. Documentation at each stage as per archaeological principles should be done as a record and also to counter criticism.

Dr. R. Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museum,
Taramani, Chennai - 600 113.

Sl. No. 7

Inspection Notes of M.G.Chellapillai, Archaeological Consultant Pertaining to *Manora* Monument, Pattukottai.

Present: S.D.O. concerned, A.E. and contractor.

As instructed by the Commissioner of Archaeology during his visit to this Monument on 4.8.2003, the four (4) RCC lintels at topmost terrace of the *Manora* column has been carefully removed and 2 numbers of best Teak wood lintels were provided.

The removal : The RCC lintels have been carefully with small chisel and hammers bit by bit removed. Since the original with iron I section was found completely corroded and later on say 30 years back to support the lintels 1" round twisted steel rods 2 Nos. to each lintel was given as support and plastered out side. Now all of them have been carefully removed and replaced with best teak wood lintel painted with anticorrosive paint and wrapped with lotus leaves and bound with

coir string is provided. This will be plastered with 1:1:5 combination mortar, in the same way the other lintels found in all floors of this column will be treated.

Original submitted to the Commissioner Archaeology, Government of Tamil Nadu, Chennai-113

M.G.Chella Pillai, L.C.E.
Archaeological consultant

Sl. No. 8

Notes of Inspection on *Masilamani Nathar* Temple (Now Lost Due to *Tsunami* in 2004)

GOVERNMENT OF TAMILNADU
DEPARTMENT OF ARCHAEOLOGY

From
Dr R.Kannan, I A S.,
Commissioner(I/c),Department of
Archaeology,CIT Campus,
Taramani, Chennai-113

To
The Spl. Commissioner and Commissioner,
Hindu Religious and Charitable Endowments
Department,119, Nungambakam High
Road,Chennai-34

Lr.No. B1/2003/ dt 03.8.2003

Sir,

Sub - Nagapattinam District-Tranquebar Taluk-Tranquebar *Masilamaninathar* temple-Inspection report-send regarding

Ref - Joint Commissioner, Hindu Religious and Charitable Endowments *Myladuthurai*, Lr Dis. Lr. No. 7254/2003/A1/ dt/ 19/5/2003 Addressed to the Commissioner of HR andCE and copy of this Office

In the reference cited Joint Commissioner, *Myladuthurai* has informed that the *Masilamaninathar* Temple now situated at seashore is proposed to be re-habilitated to the Karaikal Main Road to avoid sea erosion and consequent damage to the temple

This temple was inspected by me on 3.8.2003 along with District Collector of Nagapattinam, Thiru. Veera Shanmughamani, I.A.S., and Thiru. M.G.Chellapillai, Archl. Technical Consultant and Spl. Gr. Jr.Engineer (HQ) of this department. The rehabilitation of this temple will involve higher cost than the cost involved in renovation of the temple.

In case it is desired to reconstruct the temple elsewhere the services of this department can be used to have it done according to archaeological principles.

Dr. R. Kannan, Ph.D., I.A.S.,
Commissioner of Agriculture,
Archaeology and Museums

Sl. No. 9

Report prepared for the conservatinn of *Ramalinga Vilasam* Palace-Ramnad-in connection with the inspection of the Commissioner on 17.8.2001

Immediate steps to be taken for conservation

It is requested that, the following steps be taken immediately for the strengthening of the palace building.

1. The wooden support given temporarily on the cracks found in the facade of the palace should be removed and the worn out teak planks should be replaced immediately. At present, *Eucalyptus* wood is used for supports. The supports are in dangerous condition. This work should be attended to immediately.

2. At present on the ceiling of the *Maha mantapa*, palmyra rafters are utilized as supports instead of the decayed wooden rafters found in the Madras terrace works. New teak wood rafters should replace the old Palmyra rafters in the interest of long life.

3. Black oil paint used in the granite Circular pillars found in the middle *mantapa* and *Rama Peetah* must be removed and then hand polish treatment must be given.

4. Some of the rafters found within the arches and domes are missing and the rest are mostly damaged. So new chemically treated teak wood rafters must be inserted to strengthen the arches and domes.

5. The weathering course tiles were recently (just two years back) laid on the terrace of the entire *Maha mantapa*, but half of them were not properly laid; proper building materials were not used and hence possibilities of seepage of rain water is found. It should be rectified by laying new tiles with building materials like lime, cement and sand in 1:1:4 ratio.

6. Necessary chemical should be added as per the advice of A.S.I. Madras to avoid salinity in air and water. It is a vegetable additive.

7. Vegetation should be removed and the Chemical "Tuffalo" liquid recommended by the Agriculture department and ASI may be utilised to eradicate the maximum roof level of the vegetation. Now the roots are penetrating on the South-Western corner of the middle *mantapa* dangerously.

8. To make the *mantapas* bat free, wooden reapers of low weight may be used and invisible thin iron nets may be fixed. (Another way with minimum interference is to have lights (powerful) burning during the night for a few days).

9. On the southern wall of the *Ramalinga Vilasam*, the original lime-mortar coating has been removed long ago but the work is not completed till now. It must be completed and only finely ground sand and lime mortar must be used.

10. It is requested, that only after the completion of the civil works, chemical conservation of painting works should be undertaken. The electrical wiring should not be done on the painted walls with ancient paintings. It should be done in a concealed manner on the ground and 10 watt yellow bulbs alone should be used for lighting like in *Ajanta* Caves. Fibre optic lighting can be done. Plain lamps may be used and proper advice must be taken from M/S Philips India Ltd. regarding lighting. All these works can be executed by utilising the services of our department Junior Engineers.

Dr. R. Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl. No. 10

Name of the monument : *Siva* Temple at *Sivapuram* Village, Sriperumpudur Taluk, Kancheepuram District.

Sivapuram Siva temple was inspected by the Commissioner of Archaeology and Museums along with Executive Engineer, Public Works Department, Kancheepuram, Assistant Director, i/c, Department of Archaeology, Chennai, Assistant Executive Engineers of Archaeology, Chennai and P.W.D., Sriperumpudur on 5.10.2002 at 11.00 A.M. The State Government have allocated a sum of Rs.2.00 Lakhs under the XI Finance Commission grants.

This temple belongs to the 10th Century A.D., *Parantaka Chola* period. The period is judged from the early Chola architecture style and the sculptures like *Vaanika Dakshinamoorthy*, *Brahma* and *Durga* found on the *Devakoshta*.

Some rows of stones on the *Padma* frieze are found damaged. They are also missing in one or two places. They should be replaced with the inscriptions re-recorded as in the original synchronizing with the other stones to read as in the original.

In various places *Bhutagana* frieze and lintel (*Uthiram*) frieze are found partly damaged. As the temple is not in imminent danger of collapse, in view of the allotted amount being small only cosmetic repairs are possible. However, after a few years it may collapse, if left unattended.

While inspecting the above temple the following repair works are felt to be necessary for preservation of the temple.

1. Enamel protection notice board and information board as per A.S.I., Standard should be erected as the existing board is damaged.

2. Fencing may be done with two ply 12/2 gauge barbed wire using the existing M.S. angle posts.

3. Settlement is seen on its two sides, which can be clearly seen on all the sides of the wall of the temple structure (i.e. out of plumb). The central portion of the temple structure is alone stable (opposite to the *Dwara* of the *Nandi*). It indicates the problem of water stagnation and it may be rectified with proper excavation of the existing drainage. Missing portions of the drainage may be provided again.

4. The vegetation growth found on the *ekatala vimana* with *vesara sikhara* (single *bhoomi*) should be treated with Tuffalo (weed killer) for 30 days wherever vegetations are found on the main and *parivara* temples.

5. In the sanctum (*garbhagriha*) *iluppai* and *poongadi* timber rafters with wooden plank to be placed after pointing of the granite stones forming the inner *vimana* portion. Recessed pointing has to be made using combination mortar with the proportion of 1:1:3 using lime free from salt which is available only at *Pollachi* (A.S.I., sourcing to be adopted). While using combination mortar, serum of gallnut and jaggery in 12 kg per cubic metre in equal proportion is to be added at the time of work. This will be varied for the other works in other places.

6. Excess weathering course (dead load) may be removed and it may be renewed with proper slope in combination mortar using the salvaged old bricks (8" x 5"x1 5"). Before removing the weathering course, props may be given with a wooden plank at the top so that the ceiling slabs do not crack. Also, removal should be done by a proper power tool to minimize vibration.

7. While dismantling, proper care should be taken to retrieve the old material in good condition.

8. A door made of teak can be provided for the main entrance into the *mukha mandapa*.

9 Documentation at each stage as per archaeological principles should be done to counter criticism.

10. The work should be done departmentally as far as possible.

11. The electricity connection given by boring the roof should be relocated.

If Rs.12-15 Lakhs is made available by the Collector, proper repair as per archaeological principles can be done. These are

1. Since the outer veneer of the granite walls is out of plumb, they should be dismantled after supporting the ceiling slabs with props which end on wooden planks and soft material.

2. The load on the ceiling having been freed, the outer veneer can be removed and replaced in plumb.

3. The foundation should be excavated on the outer side and footings should be given so that new settlement after repair does not take place.

4. The core should be filled in and properly grouted.

5. The beams and capital members after the outer veneer and any isolated members of the inner veneer of granite are replaced, should be removed where necessary and put in proper position to take the ceiling load. A lot of damage on the capitals and beams with members being out of place are noticed. This has made the half pillars in the *Mukha-Mandapa* into pilasters without any connection to the walls.

6. After the entire work is over, the load should be gradually placed on the walls and beams while watching for any signs of stress.

7. The pilasters at the front door of the *garbhagritha antarala* and *ardhamandapa* should be repaired and fresh members based on existing archaeological evidence put in place.

8. The *parivara* shrines should also be repaired on the above principles.

9. The compound can be cleaned manually and planted with lawn grass. (i e., cynodon dactylon). It can be provided with a bore well and hand pump.

This will really make the archaeological monument fit to be a big tourist attraction and heritage site.

Dr R.Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Camp, Kancheepuram.

Sl No. 11

Inspection Note on *Sri Naganathaswamy* Temple at Manambadi Village, Kumbakonam Taluke, Thanjavur District

Name of the temple: Sri Naganathaswamy temple at Manambadi Village, Kumbakonam Taluk, Thanjavur District

As requested by the Collector of Thanjavur, Thiru Kosalaram, I.A.S. the temple was inspected by the Commissioner of Archaeology and Museums, Dr R Kannan, I A S on 8.10.2002. The temple belongs to the 11th century AD. It has been constructed by the *Chola* king, *Rajendra* I. The period is ascertained from the style of sculptures found in the *koshta* of the main temple and *vimana* (i.e. style of the *vesara vimana*). The *Dwarapalaka* sculptures are found missing from its *koshta*. Inscriptions are available on the *Adhistana* all around the temple. They refer to a grant to *Siva Brahmanas* for conducting daily worship made by *Rajendra Chola* I in 1020 AD. There are portrait sculptures in bas-relief of the king and his queens.

The Compound wall on the northern side (i.e. road side) has completely collapsed. The roots of the plant growth in the *vimana* have penetrated the walls and beams and damaged the longitudinal section. Ashlars stone door lintel and main beams are found in the *Mukhamandapa*. They are cracked at the centre portion and stand very dangerously. It is unsafe to enter the building. The exquisite sculptures and *Linga* kept in the main temple should be shifted for safety. The *Koshta* figures are exquisite *Chola* pieces of the early 11th Century AD.

No detailed estimate has been prepared, but a very rough cost estimate will be nearly Rs.40 Lakhs.

It is a great temple with exquisite sculptures and a lot of royal patronage in the past. It is sad to see it now fallen on evil days. Detailed prescription for archaeological repairs has not been done at this stage since there is no assurance of funds. If the Collector can get some donors or government or tourism department funds, then the temple will become a major tourist attraction as it is right on the (Chennai) Madras Road.

Dr.R.Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl No 12

Inspection Note on *Sri Ramasamy* Temple at Kumbakonam Taluk in Thanjavur District.

As requested by the Commissioner of HR and CE, Chennai Thiru M.A.Gowrishankar, I.A.S , the Ramasamy temple at Kumbakonam was inspected by the Commissioner of Archaeology (i/c) Chennai, Dr.R Kannan, Ph.D , I.A.S , along with Mr M.G.Chella Pillai, Archaeological Technical Consultant, Mr.R Narayanan, Spl G. Jr. Engineer, Department of Archaeology(HQ), Mr.Paranan, Curator of Maratha Museum, Thanjavur and temple authorities on 4 8 2003

The following Archaeological prescription is suggested for retaining its heritage value while doing structural and façade work during *Kumbhabishekam*

White washed layers at the entrance of *Rajagopuram* stone course should be removed by using wire brush, coir brush and acetic acid followed by thorough water cleaning and then washed with Teepol and water thoroughly

Sand blasting should be strictly prohibited

The temple floor level is three feet below the surrounding ground level of the street on all sides. Hence water will stagnate during the rainy season For rectifying this a number of rain water harvesting structures may be provided on the sandy portion surrounding the temple *Prakaram* for avoiding water stagnation with a minimum interval of 5 m

Moss and lichen formed on the outer walls should be treated with chemicals of Ammonia and Teepol by utilizing the service of the Saraswathi Mahal Chemist, Thanjavur, Thiru. Perumal A lot of vegetation is noticed which should be removed with Tuffalo or the TNAU tree killer

Worn out saline affected granite stones and broken stones should be removed wherever found from the inner *prakara* wall and replaced with well hand dressed stones of the same variety, carefully without disturbing the adjacent stones The present rain water drain all round the terrace is short Hence rain water flows along the wall Due to this moss and lichen are formed For rectifying this lengthier stone spouts may be provided

Wherever iron nail like objects are found on the wall, they are to be removed

Cement plastering and pointing are found in the inner and outer *prakaram* walls They should carefully be removed and in its place combination mortar 1:1:3 for pointing and 1:1:4 for plastering should be done The lime should be Pollachi lime of the highest quality All the pointing

should be of recessed pointing using lime (kankar) free from salt which is available at *Pollachi* (ASI source to be adopted) while using combination mortar extract of gallnut and jaggery 10kg to 12 kg/ cum in equal proportion should be added at the time of works. This is not a standard formula. It will be varied for other works in other places. Aloe Veru juice has to be added.

The vegetation growth should be removed along with its roots and temple garden (*Nandavanam*) may be raised.

The heap of stone members found in Northwest corner may be examined by the Spl. Gr. Jr. Engineer (HQ) of this Department and Thiru. Paranan, Curator, Thanjavur for re-using the same. If they cannot be used, they should be transferred to Thanjavur Museum, so that they are not lost in future.

Painting with enamel paint is against archaeological principles. It is better to remove the paint with careful execution under the guidance of the Archl. Chemist / Saraswathi Mahal Library Chemist and with the help of trained labour. If it is not proposed to do so, herbal cleaning may be done. However it will look faded. Fresh renewal of painting should be avoided in future as it is against archaeological principles.

Missing edging and ring of the pillar capitals may be suitably replaced.

Jali work found at the entrance of *Mahamandapam* should be removed carefully. Missing portion of the elephant shaped balustrade may be replaced suitably.

The ceramic tiles spoiling the heritage look over the granite walls at inner *Antarala* may be removed to avoid the granite wall from stopping breathing. Otherwise, the wall will crack.

Yellow lime washed layers from the inner sanctum sanctorum should be removed. (If it is sandal paste wash made based on the religious aspect, it may be left as it is).

Unsound / rotton wooden rafter beams are found at the inner sanctum sanctorum. This is the load bearing mechanism for the *Vimana*. They should also be replaced with new teak rafters (after giving anti-termite treatment).

The leaky roof terrace (porous) of the main shrine may be repaired by removing the existing weathering courses, which are damaged. In its places, lesser thickness of brick jelly lime concrete adding extract of gallnut and jaggery and pressed tiles may be adopted. Even though pressed tiles may be a modern product, it may be adopted for reducing dead load over the terrace and easy progress of work.

The portion where leakage occurs in the corridors and *Mandapams* may also be repaired by removing the cement plastering and replacing with combination mortar.

No pure cement is to be used at any cost.

Documentation at each stage of work as per the archaeological principles should be done as a record and also to counter criticism in future.

The *Rajagopuram* has been constructed with brick and lime mortar above the first *Tala* (base), which is a granite façade structure. In the granite portion, the door jamb has a crack. This can be examined after removing the plaster and replacement or I beam as appropriate can be done.

The stucco work and the brick and mortar can be repaired with 1:1.4 mixture with trained *stapatis*.

Dr R. Kannan, Ph.D., I.A.S.,
Commissioner of Agriculture,
Archaeology and Museums.

Sl. No. 13

Name of the Monument: *Swastik* Stepped Tank at *Tiruvellarai* in Tiruchirapalli District.

The Swastik Stepped Tank belongs to the period of the *Pallava* King, *Nandivarman* situated at Tiruvellarai at Tiruchirapalli District. It was inspected by the Commissioner of Archaeology and Museums along with Asst. Director of Archaeology, Madurai on 7.10.2002. It is called well in the Monument Register.

No laterite stone steps are found at the inner bottom of the tank as is found in Vijayanagar period stepped tanks. The bottom is hard gneiss. There is no water. This could be because the inlet and outlet are choked. In the course of the short time, these could not be detected. The top layer of the parapet wall coping has been dislocated in many places. No grooved joints are found on the coping stones. A beautiful carving of *Narasimhaswamy* is found on the joists connecting various segments of the *Swastik* shape. Inscriptions are found on the body and coping of the parapet. Two big slabs of the size of 4'-00"x2'-00" and 4'-00"x1'-3" have fallen into the tank from their location at the first offset from the ground.

1. Coping stones may be reset with combination mortar 1:1:3 as per norms, similarly dislocated joist has also to be reset where ever required.

2. The two dislocated slabs should be lifted carefully and reset in their original place with a base packing of combination mortar and brick jelly. This work has to be done with the help of *Stapathy*. Hollow cavities found in between the slabs are to be pointed as a recessed pointing with combination mortar 1:1:3.

3. Growth of vegetation found on the lime plastered surface should removed manually by using Tuffalo, poked at and taken out. Moss and lichen found on the surface may also be chemically treated with the help of departmental chemists.

4. The inlet and outlet, which are usually found, should be detected, excavated and made operational. In Tiruvarur temple, we detected such ancient water courses now silted up.

5. Enamel Protection Notice Board and Information Board in English and Tamil version to be provided as per ASI standard.

6. The loose stone sculptures of *Brahmi, Chamundi, Iyanar, Pallava Vishnu* found in the fenced area may be removed to Trichy Government Museum. If the Curator is interested in other sculptures, they may also be removed. This may be intimated to the Curator of Government Museum, Trichy at once.

7. The inscriptions may be chemically treated with preservative coat. The buried portion of the parapet base may be brought to light very carefully by excavating as per archaeological principles.

8. Documentation at each stage as per the Archaeological principles should be done as a record and also to counter criticism.

All the above works are to be carried out departmentally as soon as possible.

Dr R Kannan, Ph.D. I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl No 14

Comments on The Estimate for The Conservation Work of *Swastik* Stepped Tank at *Tiruvellarai* in Tiruchirapalli District

The stepped tank of the Pallava period was inspected by me (Archaeological Technical Consultant M G.Chellapillai) in connection with estimate already prepared for the Conservation Work for the above monument as directed by the Commissioner of Archaeology (i/c) Chennai on 5 8.2003 R.Narayanan, Spl Gr Engr (HQ) and Srimathi C Kamala, Junior Engineer of Tiruchirapalli Dt (concerned jurisdiction) were present

I have gone through the items of the estimate already submitted to the Commissionerate

Mere pointing is not sufficient for the top coping stone So it is suggested grouting may be done to the full depth of the stone All the pointing works should be done as a recessed pointing

As a final measure, moss and lichen affected panel sculptures may be brushed with coir brush If it is not sufficient necessary chemicals may be used for cleaning the moss and lichen

If sufficient fund is not available for vitreous enamel board, this work may be taken up on; since loose sculptures are going to be handed over to the Government Museum as ordered, the provision made for the pedestals to the sculptures is to be dropped.

If the Commissioner agrees with the above minor alterations, the estimate may be revised to current schedule of rates and sanctioned

M G.Chellapillai, L C E.
Archaeological Consultant.

Tirumalai Naik Mandapam, Alagarkoil - Madurai

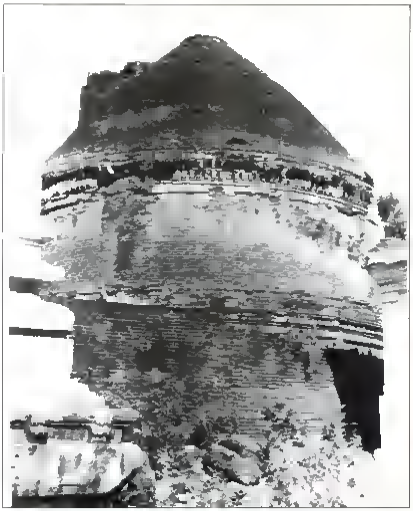
Tirumalai Naik Mandapam - Before conservation

Tirumalai Naik Portrait sculpture at *Tirumalai Naik Mandapam*

Tirumalai Naik with his queen at *Tirumalai Naik Mandapam*

Tirumalai Naik with his queen at*Tirumalai Naik Mandapam*

Tirupalaithurai Giant Granary - *Papanasam*



Dilapidated condition of the *Tirupalaithurai* granary

Damaged portions of the granary in closer view

Giant Granary - Before conservation

Dr. R. Kannan in front of the Giant Granary Before the final touch

Tirupalaithurai Giant Granary - *Papanasam*

Giant Granary - After conservation

Siva Temple - *Sivapuram*

Sivapuram, Siva temple - Before conservation

Sivapuram, Siva temple Wall - Before conservation

Sivapuram, Siva temple *Vimana* and roof - Before conservation

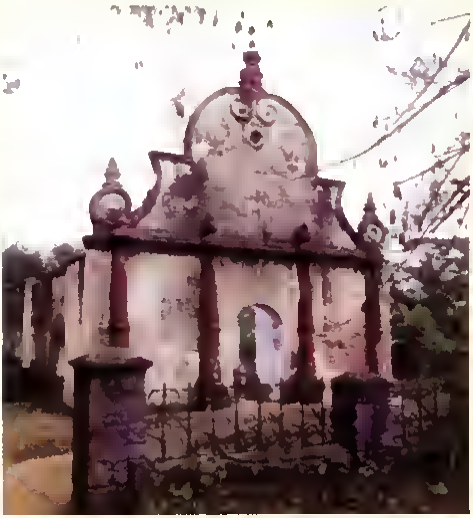
Sivapuram, Siva temple *Vimana* and roof - After conservation

Sivapuram, Siva temple Door - After conservation

Siva Temple - *Sivapuram*

Siva Temple, *Sivapuram* - After conservation

De-Lanoy's Tomb at *Udayagiri* Fort



De-Lanoy's Tomb at Udayagiri Fort (*Puliyakkunchi*) - Front View under conservation

A portion of *De-Lanoy's Tomb* - Before conservation

Conserved portion of *De-Lanoy's Tomb*

De-Lanoy's Tomb Front view - After conservation - Dr R Kannan is seen

De-Lanoy's Tomb at *Udayagiri* Fort

Inner view of *De-Lanoy's Tomb* - Before conservation

Inner view of *De-Lanoy's Tomb* - After conservation

Udayagiri Fort

Entrance of *Udayagiri* Fort - Before conservation

Fort wall at *Udayagiri* - Before conservation

Colachel Victory Pillar erected after the Battle of *Colachel* 1741 AD by *Maharaja Marthanda Varma* of *Travancore*

Rear View of *Udayagiri* Fort wall - After conservation

Udayagiri Monument Description Board

Sl No 15

Name of the Monument: Palace Buildings at *Thanjavur* in Thanjavur District and *Sartaj Mahal*

The Palace buildings of Thanjavur was inspected by the Commissioner of Museums and Archaeology, District Collector, Thanjavur, Commissioner of Municipality, Thanjavur, Executive Engineer, PWD (Building Division) Thanjavur, District Revenue Officer, Thanjavur and Revenue Divisional Officer, Thanjavur along with other officials on 8.10.2002

The existing pensioners association building is now vacant. It is situated on the northern side of *Sartaj Mahal*. This building may be taken over by this department from the PWD and utilised as a departmental office

The varnish of the bottom timber member of the entrance door frame is found faded. It may be suitably varnished with melamine. Cracks found in the southern wall of the stair entrance to the first floor may be verified by using 'tell tale' process and should be rectified suitably. Due to saline action the inner traditional plaster has peeled off in some places (walls and domes). This may be rectified by the Departmental Chemist by adopting the paper pulp method. If necessary, replastering can be done after washing with fresh water a few times with time intervals for drying.

For using the existing toilets in the first floor with the available septic tank, District Collector of Thanjavur and Executive Engineer, PWD (Building and maintenance) Division, Thanjavur have agreed. The Executive Engineer has agreed to identify the existing septic tank as percolating or non-percolating. If it is percolating type, it should be cleaned and converted into non-percolating type. This is to avoid seepage of water and settlement of the ancient foundation. It may be water tightened.

If any improvements works are required by the Royal Family, it may be addressed to the PWD or Archaeology. No works are to be carried out without the knowledge of the Department. There are dilapidated superfluous structures on the first floor belonging to the PWD. The roof above the ballot box storage room has a gaping hole. Anyone can fall through it. This Madras-terrace roof should be repaired with traditional methods.

Window frames in the *Mahal* under the State Archaeology Department are not covered with any barricade. Simply meshed with nails for the safety of visitors it should be covered by wood cross timber teak members using traditional wooden nails and necessary stickers may be pasted in all the windows stating "DANGER".

On the top most storey of the Sartaj Mahal, I found termite attack. Hence, chemical termite treatment has to be given. Wooden pillars at the top floor have visible stains. These are to be rectified by the departmental chemist. Documentation at each stage as per the Archaeological principles should be done to counter criticism.

Dr R Kannan, Ph D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl No 16

Archaeological Prescription for *Tirumalai Naik Mahal*

From
C Santhalingam,
Archaeological officer,
Department of Archaeology,
Madurai-625 001.

To
Commissioner-(i/c)(through Asst. Director, Madurai)
Department of Archaeology,
Chennai-113.

Sir,

Sub : Report prepared for the Conservation of *Tirumalai Naik Palace*, Madurai-In connection with the visit of Commissioner-reg.

It is believed that *Tirumalai Naik Palace* was built during the middle of the 17th Century A.D. Within fifty years of the construction it was demolished by the grandson of the builder, in order to build a new palace at Trichy. After that because of natural Calamities, Carelessness and encroachments this palace had to be managed to face many damages.

Thanks to Lord Napier the then Governor of Madras Presidency, who personally visited this palace during 1850s the structure is protected up to the present level. During 1870 and 1880, large scale renovation work was undertaken by the British people. At that time the stucco works, foliages

and intricate carvings were all treated and renovated. At present the state Department of Archaeology has been protecting this historical monument. During 1980, 1996-97 some fundamental works have been undertaken by this department for strengthening the foundation and structure of the building

During his recent visit of the Commissioner (Dr R.Kannan, (i/c)of this department on 20 8 2001 some of the important observations were made by himself and due instructions were given to the conservation staff for immediate follow up action. This report is submitted on the basis of the observations and instructions of the commissioner

1. A trial excavation should be conducted to find out the living datum (foundation) of the Naik period mandapa.

2. The colours used on the stucco figures during our recent renovation are not advisable. Contemporary structures and paintings should be compared with historic structures and paints used and improved in the future course of action.

Usually no enamel paints are to be used.

3. The overburden weathering course on the terrace should be removed to relieve the over load of the roof.

4. The British period building constructed on the first floor of the *mandapa* should be demolished first and the debris may be removed by the inclined plane on the southern side. First priority should be given to this work

5. The stress obtained due to non-operation of the turn buckles in tie-rods, which caused the cracks should be removed alternatively

6. The major cracks found in the ceiling of the *Swarga Vilasam* leads to the failure of the structure, and it should be mended as the next course of action

7. The over coating on the pillars is deteriorating day-by-day. This Chettinadu-type of plastering is not advisable because of its short life due to heavy human traffic. Alternative methods may be studied.

8. The sides of the barrel vault roof are corbelled with teak wood beams. Since they are in decayed condition they should be replaced with new teak wood beams

9 The struts in the Capital of the pillar have been removed in the period long after construction, which should be replaced with new teak wood beams.

10 The frieze stucco-figures on South, North and Eastern sides of the corridor tops must be treated finally and also finely and painted properly with more related original colours, which give the face lift to the palace. This work may be taken at the final stage of work.

All these above mentioned works are considered as major works and required lot of funds. Since our departmental engineers are vested with minimum financial powers, the completion of such work will take a very long time or else new Executive Engineers may be appointed with enhanced powers.

Further the Archaeological Officer, personally suggests, that this type of major work, may be entrusted to the Archaeological Survey of India Conservation Wing, which already provided trust worthy in the work of Tanjore palace, which is also our departmental monument. This report is prepared and submitted with the consultation of Assistant Engineer, Department of Archaeology, Madurai.

Dr R Kannan, Ph D., I A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl No 17

Report of the Studies of *Tirumalai Naik Palace* by Engineers

Tirumalai Naik Palace was built in the year 1636 by King Tirumalai Naik. It is said to be designed by an Italian Architect with huge tall pillars of 2.4 m. diameter and Gothic arches of Architectural beauty. Only one fourth of the palace is now in existence. It is said that the original palace has its four boundaries up to East Veli Street, in the East, South Veli street in the south, Manjanankara Street in the West and the Vilakkathoon in the North. The Entrance façade was built during British Governor Lord Napier is period.

Lord Napier, then Governor of Madras Presidency had carried out the renovation works with the help of an architect Chisholm from London in the year 1873. During this renovation works they have fixed tie rods across the Vaults, and fixed M.S. Flats for the outer hemispherical dome and for the Vaults. The *Sudai* (stucco) work in some portions of this palace is found to be of a later period as observed by the Commissioner. For example, the *Karukku* at the top edge of the *toranas* in Nadaka (Narthana) Salai rest over the fish plates of the British period. It is also observed by the

Commissioner the inner hemispherical domes stucco works are also mended in the later period, which is found to be with sharp edges without any filling of mortar. The hemispherical domes and walls are plastered with cement mortar on the outer surface in the later period. During the British renovation works they have constructed buttress wall on northern side and stitched batter wall on the Western side to provide lateral support.

During the removal of over burden earth adjacent to the outer walls, stone pillar bases and brick structures are found out. These are the evidences that this palace is extended in west, North, South, East directions. The ring wells excavated in the West and Northern side are the evidences of the location of residence of the royal family. The purpose of the tie rods is to avoid vertical cracks across the vaulted structures.

The turn buckles at the middle of the tie rods should be adjusted according to climatic condition. But it has not been adjusted accordingly. The tie rods, fixed at the smaller span of the vaults rest over the Channels that are also fixed to avoid bursting load. But the turn buckles at the middle are not adjusted according to the climatic condition.

Studies Made by Engineering Experts.

The Civil Engineering Professors of Thiyagaraja Engineering College made the following studies under the supervision of Professor Annamalai Chamy one of the expert Committee member.

1) The crack expansion studies.

2) The plate load test for finding out the bearing strength of the soil.

3) Strength of materials such as bricks wood, mortar etc.

4) Contour survey for finding out the storm water drain.

They have designed the drainage gutters pre-cast R.C.C. Slab for mending the cracks etc.

The following Works are Carried Out in First Phase:

1) Earthwork excavation around outer wall to relieve the over burden earth pressure on wall and to avoid the dampness.

2) Plastering with damp proof course below that earth level of the outer walls to arrest dampness inside the palace.

3) Providing R.C.C. pavement around the outer wall.

4) Providing retaining wall to retain the earth beyond gutters

5) Providing gutters for easy flow of storm water drain

6) Providing flooring around the inner courtyard to arrest.

7) Grouting the buttress wall and stitched batter wall

8) A little quantity of grouting works has been carried out in some portions of the *Swarga Vilasam*

9) Replacing the wooden beams in few places of the inner corridor

10) Cleaning the stucco figures and minute ornaments

11) Mending the stucco figures and minute ornaments has been completed approximately one third portion of the open courtyard

12) Providing zinc rain water pipe to drain out the storm water from the roof of the palaces.

Present Condition of the Palace Structure:

1) The entrance façade which was constructed during British period with stone masonry observe cracks at the middle of the stone beam which rest over the *Pushpapodigai*.

R C Joist should be embedded into the beam for safe transmission of load through the side pillars.

2) There are major cracks in the East and Southern side walls which leads from Ground level to top roof. This will cause shear in the foundation

R.C.C. precast slab cast in situ may be inserted at regular intervals and grouted to avoid shear in the massive walls

3) The hemispherical domes rest over the octagonal walls are resisted by triangular wooden beam at its base, are found to be in decayed conditions

4) The *Upa peedam* structure existed up to *Padmala* portion above ground level. The *Jagadhvari* portion below the ground level has to be excavated to find out the living datum of the *Naik* and to find out the existing drainage if any.

5) During *Naik* period structure *kodivalai* acts as a strut for the pillars at the capital level It was cut down in the later period, which is unshaped to the pillars It should be replaced with new teakwood beams

6) The *Mugapathram* rest over the capital of the outer pillars rest over the *vedigai* are intact up to *pothigai* level and there are small cracks in the *Uthiram* portion due to decay of wooden beams This should be replaced by new teak wood beams

7) It is observed that there are cracks in the crown of the gothic arches up to vault level This should be mended for making stability of the roof

8) The minister's dome vaulted roof rests over the teak wood *Uthiram* that is in decayed conditions. This should be replaced with new teak wood beams.

9) The flaking of pillars at the base level are due to dampness that is due to accumulation of earth level up to windowsill in the outer side

Now it was removed and the outer floor level is below the inner floor level of the courtyard

10) In the North corridor one pillar is settling down by leaving cracks in all four Gothic go thick arches, which is unsafe to the pillar

This may be rectified by providing a firm and wider foundation for safe distribution of load

11) The tie rods provided across the walls are not adjusted by operating the turn buckle according to climate condition, which exert stress on the side wall by leaving cracks

This may be removed alternatively unless otherwise there is no load coming through these tie rods

12) There is a major crack in South North direction of *Swarga vilasam* roofing portion due to falling of deceased wooden beams. These cracks are open up to first floor roof level

This should be grouted with cement slurry mixed with grinded lime mortar by adding extract of gallnut and jaggery after fixing the teak wood beam for corbelled portion

13) During the maintenance of this building by P W D they have laid flat tiles one over the other which is laid up to one foot thickness approximately, this leads to over burden pressure on the roofing portion which is unsafe to the Naik structure that is 365 years old

This may be removed carefully and minimum thickness of flat tiles should be left, over and proper drainage arrangement should be provided for drain or storm water.

This was the report of the expert committee in the early 1990s in their language

Essential Works to be Carried Out at Present: (2002-2003)

1. Grouting the minor and major cracks in *Swarga vilasam* and corridor portion should be carried out to provide intact on roofing portion.

2. Construction of the compound wall on southern side and Eastern side of T.N. Mahal to provide safety from poaching public.

3. Providing R.C.C. flooring in front of Mahal to avoid stagnation of water and silt should be carried out which is found to be below the road level at present and Rain water harvesting.

4. Mending the stucco figures and minute ornaments in the remaining 2/3 courtyard portion approximately.

5. Removing the later structure in the first floor of *Swarga vilasam* to relieve the overburden pressure. This should be carried out after the monsoon period.

6. Removing the overloaded weathering tiles in the roof should be carried out after the monsoon period.

It is the opinion of the Commissioner of Archaeology to carry out the repair works stage by stage starting from *Nadaka salai*, *Swarga Vilasam* and so on.

The Engineers of Archaeology department executed works up to Rs. 52 lakhs up to July 1997 with the guidelines of the Executive Engineer deputed from PWD.

The Assistant Executive Engineer of this department is well trained in execution of works in the above said period. If it is possible the Assistant Executive Engineer may be upgraded as Executive Engineer to carry out the renovation works by departmental with Engineers who have completed conservation training.

This report is prepared by the Archaeological Conservation Assistant Engineer, Department of Archaeology, Madurai as per instruction of the Commissioner, Department of Archaeology, Dr. R. Kannan, IAS.

Archaeological Conservation
Assistant Engineer, Department of Archaeology,
Govt. of Tamil nadu, Tirumalai Naik Mahal,
Madurai-1

Sl No 18

***Tirumalai Naik* Palace- *Madurai*, 11th Finance Commission Allotment-100 Lakhs Priority of Works to be Carried out by PWD During 2002-2003.**

Sl.No	Description of works to be carried out in order of priority:
1	Dismantling and removing dead weathering course of terrace portion
2	Dismantling and removing dead weathering course from hemispherical and elliptical domes
3	Removing the existing plastering of walls for inner and outer sides
4	Removing the old plastering from the ceiling
5	Stitching the worn-out brick work wherever necessary
6	Stitching the cracked arch roof after testing with tell tale glass to find out settlement if any
7	Probing the footing of the pillars to determine the treatment for increase of active settlement
8	Removing all decayed wooden beams
9	Removing the existing additional Madras Terrace building
10	Grouting the cracks found in ceiling, arch, walls, domes etc with combination Mortar
11	Water proofing treatment for roofing
12	Water proofing treatment for hemispherical and elliptical domes
13	Replacing all decayed wooden beams with new seasoned teak wooden beams
14	Replacing worn-out doors and windows (teak)
15	Plastering ceiling walls inner and outer sides with combination mortar
16	Mending the minute stucco works at *Nadaka salai* using combination mortar
17	White Plastering for the pillars at *Nadaka salai* using shell lime and quartz stones
18	Providing new electrical service connection
19	Construction of compound wall
20	Formation of approach road at front side
21	Providing lawn and garden all round Mahal

Sl No 19

Inspection Notes of Dr.R.Kannan, Ph.D., I.A.S., Commissioner of Archaeology (i/c), Chennai of The Mannar *Tirumalai Naik Mahal* at Madurai on 13.08.2003.

Present

1 Dr B Chandramohan, I A S , District Collector, Madurai

2 Thiru Arunachalam, Executive Engineer, Public Works Department

3 Thiru Pandiarajan, Assistant Executive Engineer, Public Works Department, Chennai

4 Thiru C Santhalingam, Archaeologist from State Archaeology

A drain should be dug all around the Mahal at a distance of two feet from the structure two feet wide and to the original depth The drain should be plastered The water collected in the drain should be drained by providing Rain Water Harvesting Structure, since the surrounding land level is at least two feet higher

1 Pillar Plastering should be set right by chemical treatment without deplastering and replastering as far as possible M/s Wacker Chemicals, a German company at Chennai and a Chemist from Tirunelveli who are specialized in this work should be consulted in this regard They may be given trial patches of 50 sq ft each to test the results

2 Tie rods with check nuts provided in the domes of the *Mahal* should be activated to working condition alternately

3 Court yard portion should be dug to the original level of existing drains and properly finished The original drains should be cleaned They may connect by terra cotta pipes from the courtyard to the outside The support props at *Swarga Vilasam* portion should be sand cushioned

4 The roof cracks to be sealed by stitching by providing suitable adjustable props with sand cushion bags packed tightly with the roof For stitching one or two bricks from roof should be carefully removed The make size and weight of brick should be ascertained The same quality of bricks should be used for stitching However, copper plates can be used or mere filleting / grouting can be done according to the seriousness of the gap The old bricks should be removed layer by layer wherever found necessary and should be replaced with new bricks of the same size Saw-tooth method should be used to ensure bonding of the bricks on the domes

5. The decayed wooden beams should be removed slowly and carefully. Teak wood beams in arch-barrel vault roof are to be replaced by providing wooden beams in alternate bays to avoid collapse.

6. Buttress walls proposed in the rear side may be dispensed with. Instead of it drain should be provided at original level as stated already to prevent further settlement.

7. In the open terrace, existing roof tiles, which are provided at a later stage should be removed up to the original level and finished with high quality pressed tiles.

8. Walls proposed to be replastered should be wetted and dried cyclically for a period of two months and then only replastered. This will remove salinity.

9. Trial trench at four points around *Mahal* should be dug by the Archaeological department to study the foundation. Trial trenches should be made at four corners of the courtyard to find out the original system of drainage and level.

10. The old *Naik* period drainage system should be exposed to drain off the storm water. To carry out this excavation work, Thiru T. Subramanian, Archaeological Officer, Thanjavur and Mr. Paranan, Curator, Thanjavur may be deputed.

11. Tell tale glass should be provided over cracks in walls and roof by the Archaeological department to study the further development of cracks.

12. A Technical Committee should be formed comprising of Dr. R. Kannan, Ph.D., I.A.S., Thiru K.T. Narasimhan, Superintending Archaeologist from ASI, Mr. M.G. Chellapillai, Retired Archaeologist and Thiru. Pandiarajan, Assistant Engineer, PWD, Chennai as Members. The Committee should fix a date of inspection of the Mahal finalise the method of doing the works to be taken up and give a report.

13. The works sbould be taken up during December after the monsoon is over and completed by March especially the portion where the roof is opened up.

14. The terrace water should be drained by the traditional spouts. The hideous Zinc pipes should be removed.

15. Where there is settlement, the footings of the pillars should be re-done. This is to be doing after freeing the roof load as stated at para 5 above.

16. The cosmetic work consisting of stucco work, etc should be done last after the structural work is over.

17. Deplastering and replastering should be done where the existing plaster has given way and not as a routine cosmetic measure over the entire outer and inner walls. The bottom

damaged portion of the pillars may be replastered and a trial work may be carried out at first Full pillars need not be replastered The product of M/s Wacker Chemicals of Germany or the Tirunelveli Chemist may be utilised for the pillar surface

18 All the buttress walls are to be removed as internationally they are not a recognised method of conservation now.

19 After carrying out the works, the removal of the buttress walls (both sides) constructed in the 19th century may be done carefully after judging the behaviour of the walls stage by stage

20 Use of cement should be avoided in pure form. Combination mortar should be used

21. Dismantling of the 19th century structure (Court Room) can be done after doing the structural work to see whether proper drainage, repair of foundation / footings of pillars and the roof can by themselves tackle the problem.

22 If not, then in the next season this work can be taken up

Dr R Kannan, Ph.D., I.A.S.,
Commissioner of Agriculture,
Archaeology and Museums

Sl No 20

Inspection Notes on *Tirumalai Naik Mandapam, Alagarkoil* on 14-08-2003

Present

1. Dr B Chandramohan, I.A.S , District Collector, Madurai
2. Thiru Arunachalam, Executive Engineer, Public Works Department, Madurai
3. Ms Haripriya, Deputy Commissioner, HR&CE Department, Alagarkoil Temple, Madurai
4. Thiru C Santhalingam, Archaeologist from State Archaeology, Madurai
5. Thiru K Gunasekaaran, Assistant Engineer, Department of Archaeology, Madurai

1 Photo documentation prior to work and after the work should be done

2 A trial trench may be excavated on the southern side 4' west from South east corner, 3' away from the structure and then slowly go towards the structure

3 Outer side and inner walls should be supported by steel plates on props before carrying out the work

4 The cracks should be grouted under low pressure and with brick stitching wherever found necessary

5. All the inner and outer course stones should be numbered before dismantling – Diagram should be drawn by the Draughtsman

6 The Buttress wall should be retained up to *Kapoda* level

7 The foundation portion should be grouted/mended before carry out the dismantling work.

8 The sub soil water should be drained by providing drain all around the mandapa

9 The south west corner is found dislodged and all the crushed stones should be mended or replaced.

10. The western side outer course stone of *Nardhana mandapa* should be reset

11 The south west corner of the *Nardhana mandapa* (the brick/brickbat core) should be stitched /mended/filled with fresh brick and combination mortar

12. The *Nardhana mandapa* western wall should be extended up to the north west corner (up to Muthiyalu Naik Statue Pillar) as it was originally,

13. The *Nardhana mandapa* inner course carved stones at the prasthara level must be carefully removed, the cracked stones should be dowelled and reset.

14 The roof should be supported with sand cushion and the *Uthiram* should be removed and set right since it is lodged due to settlement.

15 The *Narthana mandapa* peetah should be removed and reset.

16 All the fallen pillars should be salvaged.

17 Vegetation should be cleared and eradicated by Tuffalo or tree killer of TNAU.

18. In the weathering course, excessive layers added later should be removed and the Naik period layers alone should be retained. It can be mended and a layer of pressed tiles can be pasted on top

19 The missing *Chajja* Stones all around the structure should be reset with pieces strewn around. Otherwise fresh pieces have to be prepared

20. The western side *uthiram* crack is due to overloading and should be mended.

21. The settled pillar footings should be checked and provided with new footings.

22 The *Mahamandapa* western row pillars up to 5th pillar from N.W. corner of *Mahamandapa* should be dismantled and reassembled, as they are all cracked due to settlement and disproportionate load.

23. The edge crushing of the base of the pillars should be mended.

24 Telltale glasses should be fixed in all the cracked portions and inspected to see if settlement is active

25. Weep holes should be provided in the eastern side retaining wall at regular intervals as suggested by AEE, PWD, Melur. The retaining wall appears to have retained water and caused the settlement.

26 The western fencing boundary should be taken away to 5 feet distance and a R R (Random-Rubble) compound wall to be constructed as suggested by the D C , H R and C E, *Alagarkoil* Temple. This will give some moving space around the *mandapa*.

27 The Western side over burden earth to be removed and the original *adhistana* level to be exposed – but a drain all around has to be constructed to drain away the excess water.

The inspection was done under the instructions of Thiru. M A. Gown Shankar, IAS, Special Commissioner of H R. & C E. Department.

Dr R Kannan, Ph.D , I.A S ,
Commissioner of Agriculture,
Archaeology and Museums

SI No 21

Name of the Monument: Giant Granary in *Tirupalaithurai* Village, Papanasam Taluk, Kumbakonam Revenue Division, Thanjavur District.

This 17th century Giant Granary of the *Naik* period situated in the north east corner of the outer prakara in Palaivanathanaswamy Temple at Tirupalaithurai, Papanasam Town was inspected by the Commissioner of Museums along with Executive Engineer, PWD, Thanjavur and Asst. Executive Engineer, PWD, Kumbakonam on *8 10 2002*. The State Government have allocated a sum of Rs.2.95 Lakhs under the XI Finance Commission grants.

The granary is having 8.15 mts. Diameter with 9 50 mts. Height with a thickness of 90 cms Of walls. It was constructed using two sizes of bricks with lime mortar with a conical shaped roof. The brick wall in the outer face has become worn out in some places due to age and exposure to nature. Very big longitudinal cracks are noticed in two or three places. Hence settlement might have occurred. This may be verified through level survey. In the roof portion, there is dead mortar, which is adhering nominally. It is also affected by the growth of vegetation and penetration of roots of

the peepal *(Ficus religiosa indica)* Moss and lichen are also found all around the structure above the first mortar belt

The Indo French Institute, Pondicherry may be contacted for verifying its original peak point through photos (i.e whether it was flat or conical crown at the apex) Line drawing should be made clearly showing the sags and parts This work is a special nature of work and should be carried out as per Archaeological norms Therefore the rates for ASI for the *Sudai* (Stucco) mason and special material cost may be adopted Documentation also should be made very closely using digital camera at each stage of works as per Archaeological principles and also to avoid counter criticism

Before starting the work the following points are to be ascertained for retaining its heritage value

Trial trenches to verify the depth of basement and foundation may be dug very carefully without damaging the adjacent structure with the supervision of Archaeological Officer, Thanjavur of this Department

After examining the foundation, necessary estimate should be prepared for the following works

1. If the foundation is not satisfactory after verifying the trial trench, it should be excavated on the outer side Footing should be given so that new settlement after the preservation does not take place

2. Vegetation and roots grown over the structure may be removed manually by poking it out and if required treated with Tuffalo (weed killer)

3. Moss and lichen found on the outer surface should be chemically treated by utilizing the service of the Department Chemists

4. While removing the worn out bricks from the superstructure of the wall proper care should be taken and it is also to be removed layer by layer after rectification of each row using power chippers without changing the size of the bricks with ground lime mortar 1 3 or combination mortar 1.1 3

5. Lime used should be free from salt, which is available only at Pollachi (as sourced by ASI) No.12 sieve mesh is to be used for screening the sand Zeera of gallnut and jaggery in 12 to 15 kg Per cu m may be added in equal proportion at the time of execution.

6. The existing dead pointing found in the superstructure should be removed by using nail points manually without deepening and spoiling adjacent bricks and it may be repointed as said above

7. Brick work pointing is to be made as a recessed pointing using combination mortar as stated above.

8. For strengthening the conical shaped roof, necessary strutting should be given by making the conical shape on a steel plate (lined with jute sacks to act as cushioning) on the inside to act as a centering. This will free the load on the roof for stitching the roof with bricks, recovered and new.

9. After stitching, the centering should be slowly removed after making sure the roof has set sufficiently and will not cave in.

10. There is an evidence of a *chajja* (traditional sun-shade) found at the north eastern side of the top belt. It may be rectified by making the mould in brick and terra-cotta as existing at present. It should be stitched with the existing one without changing the shape.

11. Wooden ladder to enter and leave may be provided for easy access for inspection.

12. Sloped apron may be given all round the structure using the combination mortar in ratio - 1:1.3.

13. The barbed wire fencing of 2ply 12 x 12 gauge with gate should be provided at the entrance. Approved design of RCC post is to be followed. The specification and design will be furnished by the Department of Archaeology.

14. Enamel protection board and Information Board as per ASI standard should erected. The matter to be written will be furnished by the department of Archaeology.

15. Suitable lawn grass (i.e. *Cynodon dactylon)* may be planted at the frontage open yard giving pathway for easy access.

16. T.A. and D.A. find for this type of work is not sufficient. Necessary provision for inspection and guidance of the work may be added in the estimate itself.

17. Documentation at each stage as per the Archaeological principles should be done to counter criticism.

Dr.R.Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Vittala Temple - *Vittalapuram*

Vittala Temple at *Vittalapuram* - Front view Before conservation (2001) Right to Left Chella Pillai, Archaeological Engineer Chandramurthy Assistant Director Archaeology, Dr R Kannan Commissioner Archaeology and Museums (2002)

Inner yard at *Vittala* Temple, *Vittalapuram*

Another view of Northern Side of *Vittala* Temple - Before conservation

Vittala Temple - *Vittalapuram*

Vittalapuram - *Lakshmi* shrine - Before conservation (2002)

Vittala temple - Before conservation

Vittala - Before conservation
2002

Vittala - After conservation
2006

Damaged *Upa Peetah*

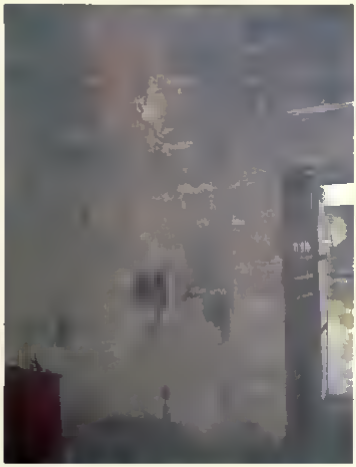
Vittala Temple - After conservation
- a view with Dr R Kannen

Vittala Temple - *Vittalapuram*

Vittala Temple - view from north east side

Vittala Temple - Front view

Panvara Devata Mandapa - After conservation



Vittala Temple, *Mukha Mandapa* - pillars, wall, corbel, beam and roof - After conservation

Vittala Temple - the excavated and conserved Well in the north east corner

Vittala Temple - *Vittalapuram*

Vittala Temple - *Lakshmi* Shrine - After conservation

Vittala Temple - Monument Information Board

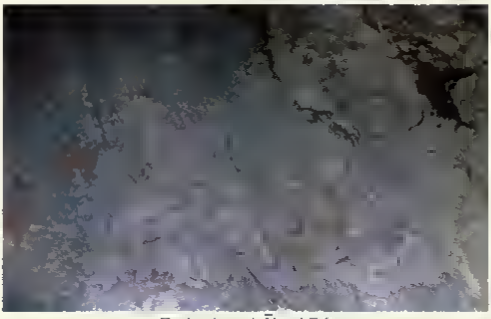
Side view of *Vittala* Temple - In final phase of conservation

Vittala Temple - *Vittalapuram*

Vittala Temple Main entrance - After conservation (2006)

Rock Art

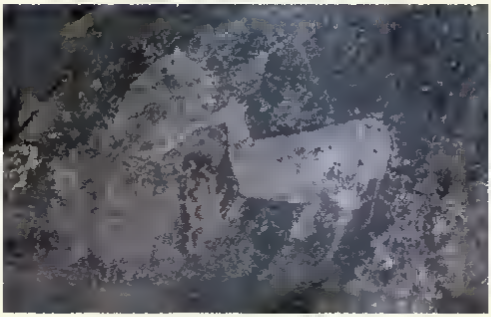
Ālambādi



Red ochre at *Ālambādi*

Rock Art at *Ālambādi*

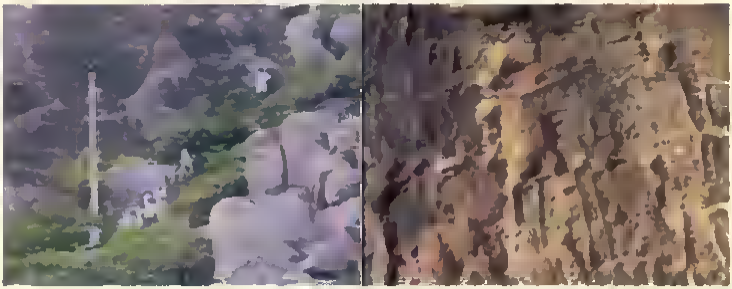
Sethavarai



Sethavarai Rock Art site

Rock Art

Vettuvankoil - Monolith temple at *Kalugumalai*



Perumukkal - Petroglyph

Rock Art at ***Kilvālai***

Sl No 22

Name of the Monument: Giant Granary in *Tirupalaithurai* village, Papanasam Taluk, Kumbakonam Revenue Division, Thanjavur District.

The 17th Century Giant granary of the Naik period was inspected by me on 4 & 2003 along with Thiru M.G.Chellapillai, Archaeological Technical Consultant, Thiru R. Narayanan, Spl. G. Jr Engineer (HQ) and Thiru Paranan, Curator, Thanjavur of this department.

Photo-stat copies of the plan of the Granary were given to the Executive Engineer, PWD, Thanjavur by the Junior Engineer (HQ) of this department. Conical finishing as per photo is to be finished and flat tiles may be places at the apex and sides of the tile are to be slightly sloped for avoiding stagnation of water.

I have particularly pointed out in my earlier inspection dt. 8.10.2002 that trial trenches have to be dug to verify the depth of basement and foundation. These may be dug out carefully, in consultation with Archaeological Officer, *Thanjavur*. But this has not been done. If any discrepancies are found in the foundation, necessary footings with belt should be provided, so that new settlement after the preservation does not takes place. Worn out/ undulated bricks at the body of the granary are to be replaced with the same size of brick and necessary pointing with combination mortar should be done. All the pointing should be a recessed pointing.

Easily removable ordinary wooden ladder with broad steps should be provided at the entrance and permanent ladder with broad steps should be provided at the inside of the granary for easy access of inspection.

Matter for the vitreous enamel protection notice board and information board will be furnished by this department shortly.

For the opening at the top of the projected portion of the roof, dead weight has to be reduced by removing one or two layers of bricks and water tightened. Wire net glass may be provided. For avoiding the damage by stone throwing due to vandalism, as an additional safety measure, wired frame may be provided.

Water bore available at the site may left as it is. Hand pump may be provided. Necessary lawns may be formed with approach way to the granary.

On completion of work an inscribed stone about the works carried out-in short form is to be kept separately.

Dr. R. Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl. No. 23

Inspection Report of the *Udhyagirikottai*

Name of the Historical Monument:	*Udayagiri fort* and Captain ***De-Lanoy's*** tomb
Place	*Udhayagirikottai* Kalkulam Taluk Kanyakumari District
Date of Inspection	**18.07.2001**

1 There is no specific mention about the distance of area (in and around) to be protected from the monument in the **Tamil Nadu Government Archaeology Protection Act.** However there are certain available guidelines framed by the central government which may be may be followed instead The Assistant Engineer, Chennai may obtain the necessary rules and regulations from the Archaeological Survey of India Based on the laws rules and regulations obtained, he may arrive at a consensus with regard to the area to be protected around the monument and the same may be uniformly followed for all the protected monuments thereafter (This was implemented in 2002)

2 At the notified protected Monument viz., the *Udayagiri* fort campus, there are other monuments (old buildings) Investigation of the surface left over from built up area has to be taken up. The monuments are to be identified, numbered and marked This will enable us to present a picture of how the whole place looked like in its hey days 3D modelling can be used to simulate the views

3 Prior to the field inspection, of the entire area, the old maps and other related records of the *Udayagiri* fort has to be obtained by the Archaeological officer from Trivandrum Archives.

4 On completing the field inspection, the final report has to be submitted by the Archaeological Officer and the Junior Engineer The report should be cross verified and confirmed with Revenue and Archival records as far as the protected area of the monument is concerned

5 Protection Master plan and conservation of the wall of the *Udayagiri* fort is essential

A plan has to be drawn including 100 meters distance on either sides of the Compound wall and it should be included in the report

6. The approach road to the *De-Lanoy's* tomb from the main entrance of the *Udayagiri* fort should be exactly marked in the map.

7. Since the entire campus area of the Monument has been declared as protected zone as per G.O 226/T.D. & C Department dated 04.09.1997, the District Revenue Officer should not entertain alienation proposals from other organisations without prior consultation and concurrence of the Commissioner of the State Department of Archaeology.

8. A copy of the above said G.O 226.T.R.R dated 04.09.1997 has to be handed over to the District collector for information and necessary action.

9. On completion of the above said works the Archaeological Officer, Government Museum Curator, *Kanyakumari* and the Junior Engineer, Ramanathapuram may jointly organise for a seminar about the Udayagiri fort under the guidance of the District Collector (*Kanyakumari*), Commissioner (in charge) and eminent professors.

Dr. R. Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

Sl. No. 24

Inspection Notes of The Commissioner of Archaeology Regarding *De-Lanoy's* Tomb and *Udayagiri* Fort - 29.08.2003.

This tomb is built in honour of Captain *De-Lanoy*, a Dutch military officer, who was defeated at the Battle of Colachel by Maharaja Udaya Marthanda Varma of Travancore in 1741 AD and taken prisoner. He was later persuaded by the magnanimous treatment of the Maharaja to become his general in the Travancore army. He reorganised the *Travancore* army on European lines and also set up the ordinance factory at *Udayagiri* Fort, which manufactured the best cannons of uniform bore outside Europe. He took part in many battles on behalf of *Travancore* and won them for the kingdom. On his death, the heir of *Maharajah Marthanda Varma*, during whose regime he died, in grateful memory erected the tombs not only for Captain *De-Lanoy* but also his wife and daughter. This is in the complex of tombs, which are now in urgent need of conservation.

Some structures like the roof of Reinforced Cement Concrete on the tombstones are clearly early 20th Century AD structures erected probably during the period of the kingdom (which existed till 1948 AD) and had a State Department of Archaeology It is well meaning though not conforming to the present thinking on conservation, when emphasis is on use of the old materials or at least the equivalent same materials and not introducing new styles or materials not contemplated by the original builders unless it is unavoidable for the safety of the monument

Archaeological Prescription (*De-Lanoy's* Tomb Complex)

1. Vegetation growth on the walls of the front arch of the tomb premise is to be removed by the tree killer from Tamil Nadu Agricultural University

2. The cracked portions in the walls are to be re-stitched

3. The damaged portion of the laterite stone masonry may be replaced by the same type of laterite stone Bricks of size 9" x 4 1/2" x 2" may be used for the damaged brick wall in the front portion of the arch This is the dimension already used

4. The damaged portion of the old plastering may be re-plastered by combination mortar 1:1:5 (Cement Lime mortar Sieved Sand).

5. There are four pillars The design of the two end pillars is of one pattern while the two middle pillars are of another pattern

6 There is a gap between the pillars and walls in the front entrance arch of the tomb The stucco plaster on the pillar in the South West Corner has to be redone to match the pillar in the North West side Pillar and the floral design in the pillar has to be maintained without any change

7 The damaged plastering may be re-plastered wherever necessary with combination mortar 1:1:5 using serum (*zeera*) of Gallnut, *Aloe vera* and jaggery

8. The plastering and concrete roofs over the tombs have been damaged in certain portions and the steel rods exposed The damaged plastering may be redone in Cm 1-3, 10mm thick It need not be dismantled as this is done in the early days of archaeology and protects the tombs from direct rain and sunlight.

9 Excavation to a depth of 3/4 feet to one foot from the level of the existing tombs or preferably a Magnetometer may be used, all round the inner area of the tomb to probe whether

any other buried tombs are there in these premises Magnetometer is preferable as the present *Maharaja Udaya Marthanda Varma* of the erstwhile *Travancore* State stated during discussion that there were no other structures.

10 The stones in the tomb may be cleaned by liquid Ammonia in 5% solution and washed immediately with application of preservative coat of Poly Vinyl Acetate (PVA)

11 The corroded and damaged steel grills enclosing the tomb area may be replaced

12 A gate may be provided in the entrance of the compound

Fort Wall

13. The damaged portion of the masonry in the fort wall may be redone to restore the original structure by using similar stones.

14 The damaged fort parapet wall may be replaced by the same type laterite stone fixed in combination mortar 1:1.5 and plastered with combination mortar 1:1:3 where it is already plastered and pointed only where pointing has been done already. It is seen that the core of the parapet wall is filled with clay. In some places near the entrances, bricks of small size with lime mortar plaster have been used as the core to form an inner wall. The core of the parapet may be filled up using the same material used in the original structure.

15 The area around the place where the ordinance factory existed may be excavated and conserved, so that at least the base of the original structure can be preserved and seen by posterity.

Dr R.Kannan, Ph.D., I.A.S.,
Commissioner of Agriculture,
Archaeology and Museums

Sl No 25

Inspection Notes on The *Panduranga Vittala* Temple at *Vittalapuram* 6 Kms. from East Coast Road near *Kalpakkam*

The Inspection/prescription report of the *Panduranga Vittala* Temple by the Commissioner of Museums in charge of Archaeology along with Mr M.G Chellapillai, the Technical consultant and the Special grade Junior Engineer of the State Archaeology Department Thiru Narayanan was prepared on 01.08.2003

Name of the Temple	*Panduranga Vittala* Temple
Place	*Vittalapuram* Village Thirukazhukundram Taluk Kancheepuram District.
Date of Inspection	01.08.2003

The following instructions were given to the *Pandurangan Kainkarya Sabha* of Vittalapuram by the Commissioner for rectification of the works carried out, as well as on the works to be carried out in the ensuing period

At present the work is in progress at the main hall, the *Mukha Mandapa*. The foundation laid has to be strengthened further

The Level of the 2nd row of the base of the *Upaana* may be reset. A gap has been created at the bottom of the *upaana* of the *Mukha Mandapa* for which pointing is being marked. In order to rectify the sub *Upaana*, necessary levels have to be taken and the stones re-set.

At the *Garuda's* shrine, the stones on the wall to be used have to be numbered and segregated as per the numbers. Once the foundation has been strengthened, the surrounding stones are to be arranged in order. The roofing has to be water tightened with tile-slabs (*Pavukarkal*) over the slabs. The weathering course has to be re-laid and plastered with Lime mixture.

Stencil may be used for numbering the stones and black paint may be used for numbering. If necessary it is permitted to seek the services of a retired Archaeology Department Draughtsman for the drawing of diagrams and numbering the stones on paper before numbering them on ground. This will prevent misplacement of Stones during reconstruction.

On the inner and outer sides of the Entrance of the sanctum Sanctorum, the serially numbered stones may be sorted and arranged in an orderly way on the respective sides itself Careful handling of the numbered stones is essential while sorting and arranging the stones

Raft or Mat foundation has to be laid out in order to obtain a strengthened foundation after which the stones are to be re-laid in order of numbers and as per the diagram already prepared as above

The present status of the *Garuda Thayar* (*Lakshmi shrines*) are to be photographed It is also understood that photographical documentation is already available regarding the details about the (*Vimana*) dome, the structure that is built over the sanctum sanctorum

The same may be submitted to the Archaeology Department On approval, permission may be given to the Kainkarya Sabha for further action

The Government Museum Curator is permitted to take the mutilated *Thayar Statue* to the museum Meanwhile the missing head of the statue, if it happens to be found anywhere in the premises in due course may be handed over to the Museum Curator

It is permitted to install the idols of the *Satyabhama Rukmani* who are the consorts of *Vittala* and the *Garudazhvar* to conform to the iconographic features of the already existing idols At the base of the statues, the year of carving is to be mentioned

Certain facts and figures as well the photographical documents about the Main tower (*Raja Gopura*) has to be got It may be either obtained from the Institute of Indology, Pondicherry by the Archaeology department or by browsing the already available records of the department

It is permitted to construct doors for the sanctum sanctorum as well for the main entrance

In the southwest corner of the *prakara* (circumambulatory passage) of the sanctum sanctorum the *Thayar sannidhi* is situated Since the southern walls of the sannidhi are found fallen, necessary repairs for the same may be carried out The methodological approach of numbering, segregating, laying foundation etc is to be followed out as per the above prescribed methodology

The *mandapa* situated in the north is also highly damaged The methodology of numbering, arranging, foundation laying etc are to be carried out as stated above

It is understood that certain correction are to be carried out with regard to the historical details on the Descriptive Board. The currently available details may be submitted to the Commissioner for further clarifications.

In the outer boundaries of the temple premises, stone pillars may be laid for ensuring protection as well preventing encroachments.

The permission is granted to the *Pandurangan Kainkarya Sabha* to carry out the above said activities.

A weekly progress report may be sent about the *Panduranga Vittala* temple construction activities. The doubts arising in connection with the works to be carried out are to be cleared then and there in consultation with the Commissioner before carrying them out.

A flower garden (*Nandavana*) may be laid in the land surrounding the temple, which belongs to the Department.

Dr R.Kannan, Ph.D., I.A.S.,
Commissioner of Agriculture,
Archaeology and Museums.

Sl. No. 26

Notes of Inspection for Vetuvan Koil (August , 2001)

This is a rock cut cave complex and cut out temple on the style of the Mahabalipuram Shore Temple and cave sculptures. The Descriptive Board and the Monument Protection Board may be made of enamel and painted in Blue and White letters on the ASI model. The present board is rusted and worn out. The vegetation on the caves may be removed by 'Tuffalo' brand weed killer used by ASI. The sculptures and rock surface amy be cleaned using ammonia solution.

Dr. R.Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Taramani, Chennai-600 113.

CHAPTER VI

HISTORY OF THE HERITAGE BUILDINGS HOUSING THE GOVERNMENT MUSEUM, CHENNAI

The Government Museum otherwise called as the Central Museum was started in the College of Fort St. George, in the premises of the present office of the Director of Public Instruction, on College Road. As the building was in a dilapidated condition, the Museum's Superintendent, Dr. Balfour advocated shifting it to another building.

In December 1854 AD, it was shifted to a building named the Pantheon, also known as the Public Rooms or Assembly Rooms, where the elite of the city met.

The building was being utilised for banquets, balls and dramatic performances from the last decade of the 18th Century. The estate of the Pantheon was the property of Hall Plumer, civil servant and public works contractor who subsequently, in 1793 AD, assigned the grounds to a Committee of 24, which regulated the public amusements in the city at that time. In 1821 AD, the Committee sold the main house and central garden space to E.S. Moorat, a wealthy Armenian merchant who in turn, sold it back to the Government in 1830 AD, for Rs.28,000. The property was originally 43 acres in extent and stretched from Casa Major Road to the present Police Commissioner's Road, and it was flanked by the Pantheon Road and Halls Road.

The Public Library was started in 1853 AD. It was opened to the public in June 1862 AD. The construction of the library and lecture hall began in December 1873 AD and completed in 1875 AD and formally opened by the Governor on March 16, 1876 AD. Captain Mitchell, Superintendent, was responsible for strengthening the library. He is regarded as the originator of the Connemara Public Library.

It was formally opened on December 5, 1896 AD by Sir Arthur Elibank Havelock, the then Governor and named after its progenitor, Lord Connemara, Governor of Madras. Designed by H Irvin, the then Consulting Architect to the Government of Madras, it had a magnificent hall with a splendid reading room and beautiful teak wood shelves.

The library had an imposing tower 200 feet high, the highest in Madras at that time. But in March 1897 AD, the tower was demolished as it was found to be in a precarious condition.

In December 1896 AD, the Front Building (Anthropological Galleries) and The Museum Theatre were opened. The new extension (main entrance) was built in 1939 AD in order to display stone sculptures, period-wise. The Government Museum took over the Victoria Technical Institute Building (constructed in 1909 AD) and named it as National Art Gallery and was thrown open to the public on November 27, 1951 AD.

In 1951 AD for the Centenary Celebrations, the flooring of the National Art Gallery was redone. This work was carried out by the Public Works Department. The grandfather of the writer, late Sri. T.S. Padmanabha Iyer was the Executive Engineer, North Presidency Division who carried out the work. The National Art Gallery was dedicated to the nation by Pandit Jawaharlal Nehru the first Prime Minister of India Sir Krishnakumar Bhavasingh, Maharaja of Bhav Nagar, the Governor of Madras Province and Sri. P.S. Kumarasamy Raja, the Chief Minister participated.

For the 151st Anniversary Celebrations on 19.6.2003 the Museum Theatre, a part of the compound wall, the Bronze Gallery Building etc., were conserved and restored. Several galleries like the Bronze Gallery, the Numismatic Gallery, the Contemporary Art Gallery, Rock and Cave Art Gallery were refurbished. New galleries, the Exposition on the Progress of Industries and Handicrafts in Tamil Nadu and the Holographic Gallery were organised. The Bronze Gallery with its Cosmic *Nataraja* display is now world famous.

All this work was inaugurated by Dr. A.P.J. Abdul Kalam, the President of India. Thiru. Rammohan Rao, Governor of Tamil Nadu and Dr. J. Jayalalithaa, Chief Minister of Tamil Nadu participated.

CHAPTER VII

CONSERVATION OF THE HERITAGE BUILDINGS IN THE GOVERNMENT MUSEUM, CHENNAI

Inspection Report on Ancient Buildings in Egmore Museum Complex, Egmore, Chennai-8

K.T. NARASIMHAN,
Superintending Archaeologist

During the colonial period a number of historical as well as land mark buildings were constructed on Pantheon Road, Egmore Chennai-8. Out of these, some of the buildings are situated within the compound wall of Government Museum, Egmore.

In view of the proposed conservation project, the following buildings were inspected by me along with Shri. R. Kannan, I.A.S., Commissioner, Egmore Museum, Government of Tamil Nadu along with his officials as well as ASI officials. The inspection was made on 2nd August 2000 to assess the physical condition of the following buildings.

1. National Art Gallery and Pantheon Buildings.
2. Amaravati Gallery.

National Art Gallery

a History. This is a magnificent double storied building reflecting Indo-Saracenic architectural style. It was constructed in 1909 when Sir Arthur Lawley, the then Governor of Madras declared it open.

This building was earlier known as Victoria Memorial Hall. In 1942, the army took over the building for its use. During post – World War II, the then government had decided to convert this building for public utility and made it an art gallery. It was thrown open to the public in November 1951 by the first Prime Minister of India, Shri Jawaharlal Nehru.

b Present Physical Condition.

This 90 year old unique building is in pathetic condition due to age, negligence as well as adopting wrong conservation methods. Crowning all these things, during the rainy season it suffers with water logging for days together because the rain water cannot reach the river *Cooum*, which flows a furlong away from this complex thorough Pantheon Road whose level is very much increased due to providing tar road from time to time (many layers).

This building is a *Suddha* type of Architecture having stone as core material The pink colour sandstone, a sedimentary rock was used for walls, tombs, canopies etc Marble was used for flooring As on date, there are many granite stone pillars on the top of the building where rows of free style *Rajput* type of tombs are constructed It is very difficult to ascertain where these igneous (granite) stone pillars were originally used atop, the weak stone structure or subsequently replaced, because normally a heavier stone member cannot be used over a weak stone It is has resulted in a clear cut stress over the walls Many outer veneer pink sandstone members have crumbled as well as cracked also

This entire structure is having a clear sign of settlement The east oriented architecture has got a flight of steps at the entrance as approach to the building It has flanking projections with two canopies on either side, twin *minars* in the connection of main building and flanked structure as well as a single *minar* at the entrance at the extreme end of either side The main entrance has Gothic architectural influence in the arches, the window as well as in the pillars.

The entire structure is settled towards west for the simple reason mentioned earlier The rain water has entered into the foundation and might have caused imbalance in the foundation resulting in this settlement Similarly, the flanked structures also clearly show settlement gradually from the main building to the respective extreme end. This has resulted in several vertical cracks seen on its exterior

The flooring (ground floor) clearly indicates the settlement of the structures because the gradient is seen from the centre point towards the wall, which clearly indicates that he entire structure had settled It is not clear whether the settlement is still active or not Unless tell-tale examination is done over a brief period, this fact cannot be ascertained

I am told that the roof is profoundly leaking In the recent past to prevent the leaking, a number of tar felt sheets were affixed one over the other, which is a common remedy measure adopted by P W D on every ancient monument The so called tar felt treatment (conservation) is very much harmful instead of helpful, because it become very heavy once it gets drenched Besides, it allows the rain water through its crack to the roof With the result, the head load of the building is multiplied The same story is seen in the building in question

It is not possible to identify all the problems of this building in a day or by one inspection It needs physical examination through various angles besides making trial trenches to study the

***Publisher's Note** : Some of the Colour photos pertaining to the conservation of the buildings are seen in pages no 207 - 215*

foundation as well as exposing the roof on one or two points to understand the fate of the roof. To undertake this major conservation work one is expected to make a careful and meticulous study of the material usage, present condition, future proposal, etc. However, the following major items are given for broad understanding of the existing problem of this building.

Major items are mentioned hereunder.

1. Earth excavation all around the building.
2. Trial trenches at regular interval to study the foundation.
3. Total dismantling and re-erection of the frontage including flight of steps.
4. Dismantling the flanking structures after proper documentation (drawing/photo/video).
5. Dismantling the main structure if it is inevitable. The procedure as said above.
6. Purchase of pink sandstone.
7. Purchase of other materials.
8. Providing invisible foundation.
9. Removal of head roof material.
10. Water tightening of the roof.
11. Removal of flooring.
12. Resetting of flooring after proper levelling.

For the said items, the minimum expenditure will be more than Rs. 3.00 Crores. In case, the entire building has to be dismantled and re-erected, the expenditure may go up beyond Rs. 5.00 to 6.00 Crores. Therefore, the earmarked amount for conservation of National Art Gallery seems to be justified.

II. Reorganisation of the *Amaravati* Gallery

A.) History: The Egmore Museum is a multipurpose Museum. It houses antiquities of various disciplines. The building itself is more than 200 years old.

Here in the Archaeology section, the *Amaravati* Gallery (sculpture gallery) is unique and most famous for its sculptural art. The *Amaravati* stupa at *Amaravati* in Guntur District, Andhra Pradesh was constructed during the 3rd Century BC by a *Satavahana* who was the contemporary of Emperor Asoka. Greenish lime stone was used in the *stupa*'s construction.

During the first decade of the last century, the then District Collector of Krishna District in Andhra Pradesh, followed by many archaeologists conducted excavations at *Amaravati stupa* site and brought out many invaluable lime stone sculptures such as drum slabs, dome slabs, lotus medallion, etc. which were part of the *Mahachaitya* of the *Amaravati stupa*. They were brought to Madras when it was under the Madras Province.

The said sculptures are on display since 1879, in Government Museum Egmore, Chennai. Unfortunately they are embedded on the walls and some screen walls are made within the gallery in which they are permanently mounted.

III. Improvement to the Drainage, Landscape, Lighting, Etc.

Drainage

The entire open area needs proper landscaping, drainage as well as lighting. The periphery area like Pantheon Road as mentioned earlier in the report is very much raised due to relaying of Tar road several times during the last century. Earlier, the rain water used to flow to the Pantheon Road, from there the water used to reach Cooum River. Now, the earlier system is totally abandoned.

Due to water logging, settlement has taken place almost in all the buildings. Besides, no building has got proper apron except the Connemara Library old building. Due to this stagnated water percolates into the core as well as foundation, which has resulted in a number of vertical cracks in almost all buildings.

Therefore each building should be provided with an apron at least of 1 meter width preferably made of stone with proper gradient so as to prevent rainwater percolation into the foundation.

Landscape

There is sufficient open space in between the building as well as frontage right from Pantheon Road Compound wall. The museum is an informal educational place where people of all walks of life enjoy by seeing the museum collections. The landscaping with proper age, seasonal flower bed, besides lawn will very much improve the environ of the entire complex. As on date it is dry ugly with some unwanted semi-permanent structures, bunks, etc.

Lighting

In the modern era lighting is very much essential, to bring out the buildings in proper presentable condition. All the existing electrical fittings, wiring, etc are a century old and mostly damaged also. Therefore, the lighting arrangement has to be done thoroughly. However the detailed

break-ups to be cost effective, only the concerned agency given can under take this work. The ear marked Rs. 2.5 Crores for all the said three works is the barest minimum.

Post Script

Identification of unique pink stand stone for the restoration of the heritage compound wall of Government Museum, Chennai.

The pink sand stone used in the compound wall and National Art Gallery has been identified after much research by Dr. R. Kannan, I.A.S., Commissioner of Museums, as that taken from Andhra area bordering Chennai like Satyavedu up to Rajamundhry. It is soft pink stone that occurs between two seams of gneiss. It is not easily available now. Since it was pink sand stone, it was thought to be brought from Jaipur, Bhopal etc. This identification was done by Dr. Alexander Rea, the then Curator, Geology Section, Government Museum, Chennai and published in a article in 1851 and by the Professor of Geology of Lucknow University in 2002. No local geologist could identify it. This identification enabled us to recreate the missing portion and to restore the compound wall to its pristine appearance.

Inspection Notes on The Renovation of Compound Wall in Front of Government Museum along Pantheon Road at Egmore Up to The Front of The National Art Gallery Building of Dr.R.Kannan, I.A.S., - 20.10.2001

The Government Museum, Egmore, Chennai-8 was started during 1851 and has completed 150 years. It has an area of about 16 acres. There is a compound wall on all the four sides. The length of the compound wall on the front side of the Museum is around 315 meters in which around 135 meters length of compound wall along the Pantheon Road from the Casa Major Road has an elaborate design executed on laterite red stone (from Satyavedu, Andhra Pradesh). It was built in 1905 AD around the same time as the construction of the Victoria Memorial Hall (where the same type of stone and carving is used). It can be classified as a heritage structure. The balance portion of around 180 meters is of a different design at present. It is built of bricks and banisters. It is not known whether this was the original structure or it has been subsequently built. From appearance it appears to be a later addition or renewal not to original design.

During the inspection it was decided to renovate the existing damaged heritage portion of the compound wall.

The existing heritage compound wall was built with sand stone Several studies by IIT, Engineering Colleges and INTACH had wrongly identified it as red sandstone from Rajasthan, though the pressure test showed only around 250 kgs/sq cm as against around 450 kgs /sq cm for Rajasthan stone The correct identification was done with the help of the Professor of Geology, Lucknow University

The Commissioner of Museums has identified that similar stones are available at Satyavedu of Andhra Pradesh State So it was instructed to use those stones for the renovation work

Due to rise in the adjoining road level the height of the compound wall has come down. The stone masonry was also damaged in several bays of the compound wall

Hence it was decided to renovate the heritage portion using the stones available at Satyavedu The stones may be made available at Mahabalipuram The stone work may be undertaken using the Sthapatis at Mahabalipuram

Necessary splays may be provided at the entrance gates of compound wall for easy vehicular movement

The heritage portion of the compound wall may be placed over a base of 2 ft 6 inches height of regular RCC masonry compound wall, which may be clad with wire cut bricks so as to preserve the heritage appearance

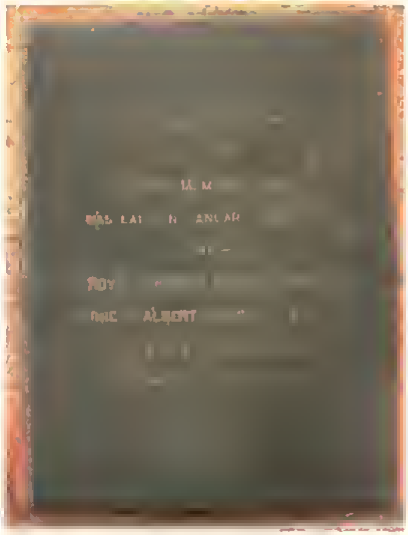
The existing design of the stone panels and pillars has been copied on paper and should be reproduced on the new stones when they are dressed and carved This will make the new pieces a carbon copy of the original where they have to be replaced due to the original panels having been baldy damaged as to be not capable of being re-used Where it can be re-used, that should be done

Photo documentation must be done at each stage before and after conservation and restoration

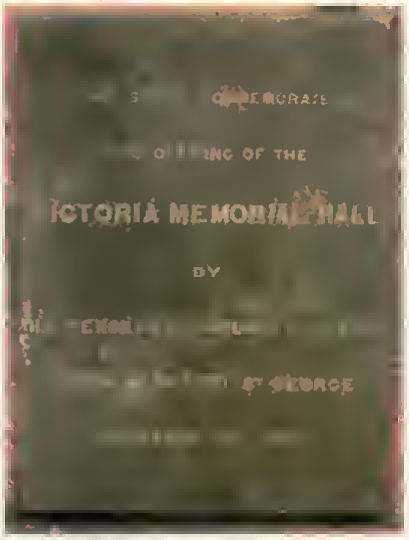
Dr R Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology and Museums,
Government of Tamil Nadu

Government Museum - Chennai

National Art Gallery, Government Museum, Chennai



The foundation stone of the Victoria Memorial Hall was laid on Jan 24th 1906 by His Royal Highness George Frederick Ernest Albert Prince of Wales P.C. K.G., C.G.S.I., G.C.M.G., G.E.I.E., G.C.V.O., I.S.O.



Stone laid to commemorate the opening of the Victoria Memorial Hall by H.E. The Hon. Sir Arthur Lawley C.C.I.E. K.C.M.G. The Governor of Fort St. George on March 23rd, 1909

Government Museum - Chennai

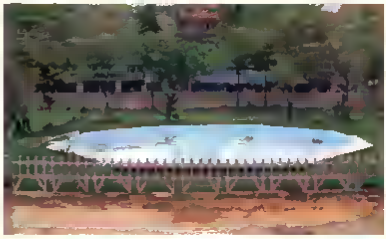
Museum Theatre - Before conservation

Museum Theatre - After conservation

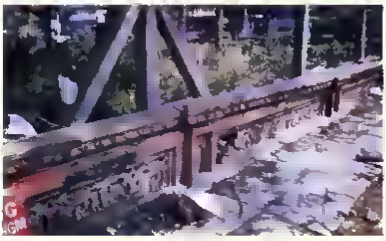
Museum Lawn - Before Landscaping

Museum Lawn - After Landscaping

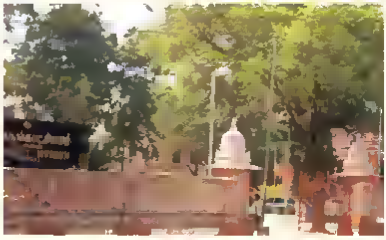
Fountain - Before conservation



Fountain - After conservation and Landscaping



Compound Wall - Before conservation



Compound Wall - After conservation

Government Museum - Chennai

Compound Wall - Before conservation

Compound Wall - After conservation

View of Front Building - During conservation

View of Front Building - After conservation

Front Building - Before conservation

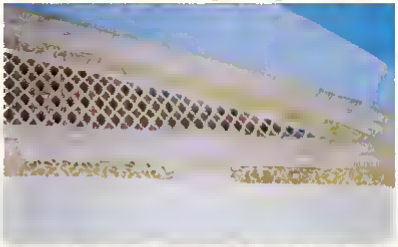
Front Building - After conservation

Government Museum - Chennai

Museum Theatre Corbelling – Before conservation

Museum Theatre Corbelling - During conservation

Museum Theatre - Damaged Cornice work - Before

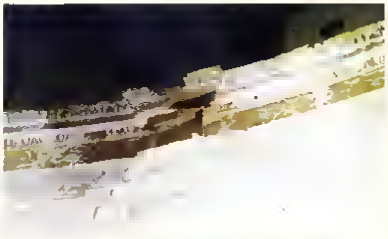


Museum Theatre – Conserved Cornice work - After

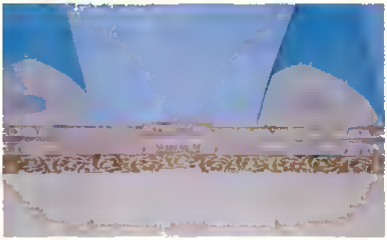
Museum Theatre Verandah - Before

Museum Theatre Verandah – After

Government Museum - Chennai



Museum Theatre -Damaged Cornice - Before conservation



Museum Theatre -Conserved Cornice - After conservation

Damaged portion of Museum Theatre

Conserved portion of Museum Theatre

View - Before Landscaping

View - After Landscaping

Inauguration of Travancore Gallery - at the Kanyakumari District Museum - August, 2003 (Right to Left) Dr. R. Kannan, I.A.S., Commissioner of Archaeology, Agriculture and Museums, Thiru Rajesh Lakhoni, I.A.S., Collector, His Highness Maharaja Udaya Marthanda Varma of Travancore (then Elayaraja)

Amaravati Gallery

Amaravati - artefact removal

Dr R Kannan operating the power drill
- at the start of opertaions

Wall - After conservation using *Moghul* plaster

Sand Blasting

Bad effects of sand blasting which has resulted in a crack in the bottom part of a pillar near the *Ramana* Cave temple mended by application of cement in the Thousand Pillered *mandapa* of the *Arunachaleswarar* Temple at *Tiruvannamalai*

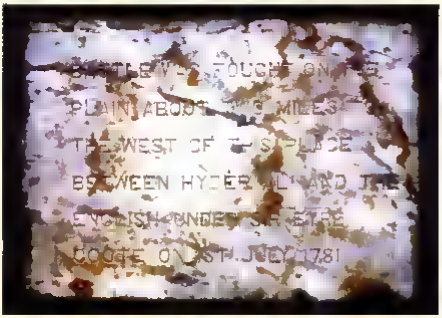
Bas relief sculpture badly damaged near the *Ramana* Cave temple in the Thousand Pillared *mandapa*

Another instance of damage in the Thousand Pillered *Mandapa* of *Tiruvannamalai* Temple

Dr R Kannan Special Commissioner of Museums inspecting the roof of the Thousand Pillered *Mandapa* *Tiruvannamalai* Temple

Manual cleaning with liquid Ammonia - the right method of cleaning demonstrated at *Meenakshi Sundareswarar* Temple *Madurai*

Porto Novo


BATTLE WAS FOUGHT ON THE
PLAIN ABOUT TWO MILES
TO THE WEST OF THIS PLACE
BETWEEN HYDER ALI AND THE
ENGLISH UNDER SIR EYRE
COOTE ON 1ST JULY 1781

Porto Novo Marble Plaque commemorating Battle of *Porto Novo* 1781

Porto Novo Mast of old ship in poor condition 26-10-2006

Sir Eyre Coote (1726-1783 AD)

It is an oil painting painted by Thomas Hickey a British artist worked in India during 19th century During his stay in Madras from 1812 to 1824 he was employed for conserving the portraits of Governors and Generals The portrait of Sir Eyre Coote had been copied on to a canvas by him Sir Eyre Coote had served as the Commander-in-Chief of the army from 1769 to 1770 and 1778 to 1783 (Portrait in the Collections of the Government Museum, Chennai)

Inspection Notes for the Repair to The Museum Auditorium - 20-8-2002

The Museum Auditorium was constructed in 1896 AD on the model of then Globe Theatre, London by the British. The acoustics are so good that a mike is not necessary. It has a unique semi-circular seating arrangement. It is constructed of unplastered red bricks, which make it look like a British construction. This type of building is characteristic of Indo- Saracenic architecture of Chisholm and other British architects at the turn of the 19th Century and early 20th Century AD. This auditorium has a seating capacity of 558 persons.

The roof of this ancient Museum Theatre is leaky at several places. The roof is of a shell type covered with Galvanised Iron sheets over teak wood planks. The teak wood planks and the gutter arrangements at the end point have lost their lives and are worn out in many places. Hence the damaged Teakwood planks around the periphery of the roof may be cut away and replaced with fresh teak wood planks. Over that two layers of Aluminium sheets may be provided with gutter arrangements so as to have more numbers of lines of defence, before water reaches the wood in case of leaks in future. The layers must connect to the spout of the drain pipes, so that at each stage they can drain directly without affecting the wooden members. The spout of the gutter may be finished monolithically. The gradient of the gutter is very important.

Similarly the roof of the veranda is also leaky and has to be repaired. The damaged pressed tiles may be removed and fresh weathering course may be laid using brick lime jelly to the required slope and finished with pressed tiles. The number of rain water spout pipes may be increased so as to reduce the time taken by the run off water to drain.

The spout pipes may be re-cast using cast iron similar to that of the existing damaged ones thereby conforming to the original heritage design and material.

Due to the leaky roof, all the cornice works inside the auditorium have been completely damaged. This has to be carefully restored to the same design using well-trained *Sthapatis* according to archaeological principles using the services of Thiru K.T.Narasimhan of the Archaeological Survey of India.

The chairs inside the auditorium are completely damaged. The chairs in the central circle meant for VIPs may be replaced with new ones and the other audience chairs in the outer circle may be repaired. The quality of the material used must conform to international specifications. New upholstery may be provided of the quality specified above.

The stage of the auditorium is made of teak wood planks, which are in damaged condition This may be rectified with parquet flooring using teak wood strips of 6"x1" and adopting the approved design The opening portions of the stage have to be retained as such and the parquet flooring to be laid likewise This flooring is a second best to the alternative of replacing the original teak members, which was felt to be too costly

During rainy seasons due to water logging and due to rise in water table as a result of the road level having been raised, water enters into the auditorium through the flooring by hydraulic pressure. Also when water collects in the tank (pond) on the rear side of the Museum, the hydraulic pressure also acts as an added factor

Hence to avoid this necessary pavement and drain arrangements have to be undertaken around the auditorium, so that water drains away into the drain or into rain water harvesting holes

The walls inside and outside of the auditorium are also damaged. This has to be re-plastered using combination mortar 1:1:5 (lime of *Pollachi* quality used by ASI, cement and sand sieved by No 12 sieve, serum of gallnut, *aloe vera* and jaggery) The final coat has to be by fine ground plastering using yellow ochre, white of eggs in addition to the traditional ingredients specified above This is commonly called *Moghul* plastering This has to be carried out inside the auditorium The spongy layer of jute provided in the walls at selected places should not be disturbed and has to be restored in a similar way so as to have good acoustics This treatment has also to be given to the verandah behind the auditorium, which is the approach to the stage from behind This verandah connects the Arms Gallery Building to the Auditorium Building

The roof inside the auditorium is of semi spherical shape Due to leakage and ageing, the fibrous materials provided beneath the roof have started peeling off The G.I sheets are corroded Hence the loose fibrous materials can be removed The damaged G.I sheets should be replaced. The entire G.I sheet roofing should be painted with MRF primer and over that water proof London based putty has to be applied to provide the roughness for good acoustic effect

Due to the previous repeated colour washing, the archaeological features in the outer walls of the auditorium have been completely erased To expose the hidden archaeological features, the entire walls have to be completely scraped with coir brushes and wire brush may be use only in places where there is a stubborn coat of lime or extraneous material

The scraped walls have to be protected from rain by spraying German based water replaced chemicals of M/S *Wacker* of Germany Similarly the stone masonry steps in the auditorium may be cleaned with water based chemicals of M/S *Wacker* of Germany so as to have a fresh look The damaged nosing of the stone masonry has to be replaced with the same type of stone masonry

Photo documentation must be done at each stage before and after conservation and restoration.

Dr.R.Kannan, Ph D , I A S.,
Commissioner of Archaeology and Museums,
Government of Tamil Nadu

Inspection Notes on the Geology Gallery - 21-9-2003

The Government Museum is located in an extent of 6 67 hectares It contains various buildings housing 43 galleries The Geology gallery is housed in a building that was transferred to the Public Works Department for maintenance in the year 1911AD as per the Register of Public Buildings maintained by PWD It is in the original Pantheon Buildings built around 1790 AD The gallery originally served as a Dance Floor of the British Citizens of Madras. The verandah surrounding the ground floor must have served as a place for the brass band to play

The roof of the Geology block building has a Mangalore tiled roof over flat tiles set in lime mortar Due to ageing the Mangalore tiled roof is damaged Hence heavy leakage is noticed during the rainy season The flat tiles are also peeling off from the roof thus endangering the visitors The teakwood rafters and reapers are also damaged because of the dampness as well as termite attack. Hence, it is decided to repair the damaged Mangalore tiled roof For doing that the entire Mangalore tiles and flat tiles may be removed from the roof The damaged teakwood reapers and rafters may be carefully identified by knocking the each and every Teakwood member using a mild hammer The damaged Teakwood reapers and rafters have to be replaced with new Teakwood reapers and rafters After the affected teakwood members are replaced, re-roofing may be taken up using the available as well as new flat tiles and Mangalore tiles of the same quality, dimensions and design as the original For this purpose, samples of the original may be carefully preserved after they are dismantled After, conservation samples of the old and new materials have to be put on display so that visitors and scholars may know how the work was done The Mangalore tiles may be set over flat tiles using lime mortar 1 2 (*Pollachi* quality used by ASI) The re-roofing should be started from one end and should be evenly carried out on either side to avoid imbalanced load

A portion of the Geology block is of Madras terrace roof, which is also found to be leaky during rainy season The leakage of the Madras Terrace portion may be arrested by dismantling the existing pressed tiles and weathering course and relaying the weathering course using lime and brick jelly in the ratio 1 2 5, with proper slope, beaten well with wooden wedges Serum of gallnut and jaggery and *Aloe Vera* may be added, the last since salinity is likely due to nearness to the sea. Over the finished surface, pressed tiles should be laid in cement mortar and the joints pointed properly

The walls of the gallery have developed cracks at certain places These are thick walls of 2 feet thickness with old bricks of large dimension set in lime mortar The wall plastering in many

places has peeled off due to salinity and age Hence, it is suggested that after dismantling the Mangalore tiled roof, the entire wall should be carefully examined with a wooden hammer to listen to sound change like hollowness This will show up hollows The core of the wall should be free of hollows after treatment After structural treatment, the wall may be plastered in combination mortar 1:1:5 to avoid future development of holes The cracked walls should be carefully dismantled and broken bricks should be individually replaced with the same type of bricks In case of vertical cracks it should be followed right up to the foundation, which may have to grouted etc The peeled off plastering should be deplastered carefully and the exposed brick work should be washed thoroughly with salt free water for 15 days and allowed to alternately dry and be wetted By doing so the dissolved invisible salt will be washed away After thorough rinsing, the walls should be replastered using combination mortar 1 1 5 (lime of *Pollachi* quality used by ASI, cement and sand sieved by No 12 sieve, serum of gallnut, *aloe vera* and jaggery) as is being done by the Archaeological Survey of India as advised by Thiru K.T.Narasimhan Superintending Archaeologist The damaged cornice work on the walls should be restored in the same pattern using archaeological experts, after preparing drawings of the original The entire block should be given anti termite treatment

The showcase in the central well of the gallery in the Ground Floor should be protected while doing the re-roofing by closing the well portion in the mezzanine floor

The Gap in between the wall plates and the joists of the roof should be closed with stainless perforated steel sheets to avoid pigeons entering into the gallery The damaged glass provided in all the ventilators should be cleaned with potassium permanganate solution after replacing the broken glass panes

The walls should be finished with plastic emulsion and the doors and windows should be varnished with polyurethane to bring out the beauty of the teak wood In case, this is not possible due to cost, enamel paint as already in existence may be provided The wooden steps may be varnished and shall be provided with coir mat to avoid noise

The floor should be relaid with hand dressed granite tiles to conform to other parts of the Pantheon Building

Photo documentation must be done at each stage before and after conservation and restoration

Dr R Kannan, Ph.D., I.A.S.,
Commissioner of Archaeology, Agriculture and Museums,
Government of Tamil Nadu

Archaeological Notes Inspection on the Heritage Office Block (2004)

The Government Museum is located in an extent of 16.67 hec. There are several buildings housing various galleries and the office. The Office block was constructed in the year 1912-13 AD

Floor

The floor is of Cuddapah stone at present. This stone is a native stone for this region. It can be renewed with similar stones where there is damage

Walls

The walls of the Office block have developed cracks in certain places due to point loading over the arch portions of the doors and windows. In the room presently occupied by the Assistant Director Thiru Lakshmnarayanan, there is a crack from the foundation due to settlement up to the window on the southern side. The wall plastering in many places has peeled off due to saline action as well as due to water seepage from outside the building due to capillary action. This is because around the outer wall there is a cement platform at a higher level than the floor level. Due to cracks at the junction of the platform and the wall, rain water that stagnates seeps into the core.

Conservation Measures for the Wall

It is suggested that after dismantling the Mangalore tiled roof, the top portion of the wall should be carefully examined and should be ascertained to be free from any holes in the core of the wall. Sounding with a wooden mallet should be done on the entire wall so that hollows are located. The wall may be grouted with combination mortar 1:1:5 and brickbats if necessary(if hollow is too big, or bricks replaced) to avoid future development of holes in the core of the wall. The cracked portion of the walls should be carefully dismantled and broken bricks should be individually replaced with the same type of bricks. To avoid water seepage from the bottom of the wall due to capillary action, suitable pavement and drain should be formed all around the office block to avoid stagnation of water.

Roof

The roof of the office block has a corrugated Mangalore tiled roof over flat tiles set in lime mortar. Due to ageing the Mangalore tiled roof has been damaged. Heavy leakage is noticed during the rainy season. The flat tiles are also peeling off from the roof thus causing danger to the inmates of the office. The wooden rafters and reapers (all teak) are also damaged because of the dampness as well as due to termite. Hence it has been decided to repair the damaged Mangalore tiled roof

Conservation of Roof

For carrying out the repair to the roof, all the corrugated Mangalore tiles and flat tiles may be removed from the roof. The damaged wooden reapers and rafters may be carefully identified by knocking each of the wooden members using mild hammering. Thus identified damaged wooden rafters and reapers have to be replaced. After ascertaining all the wooden members to be replaced, re-roofing may be taken up using the available as well as the new Mangalore tiles (of same pattern and quality as the old ones) over flat tiles. The Mangalore tiles may be set over flat tiles using lime mortar in the ratio 1 2 (one of lime and two of dry river sand). The re-roofing should be started from one end and should be evenly spread on either side.

The damaged and the peeled off plastering should be deplastered carefully and the bricks should be exposed. The exposed brick works should be alternately rinsed thoroughly with salt free water and dried for a minimum of 15 days. By doing so the dissolved invisible salt and dissolvable other chemicals will be eliminated. After thorough rinsing the wall, it should be replastered using combination mortar 1 1 5 as adopted in the Archaeological Survey of India.

After that plastering the bottom of the flat tiles has to be pointed with lime mortar 1 2 and white washed. Similarly the repaired walls and other portions of the wall are to be carefully scraped and may be colour washed. The wooden members may be painted with enamel paint (ivory) as already in existence.

Dr R Kannan, Ph D , I A S.
Commissioner of Museums.

Note: Several deviations took place later. In 2005, glazed tiles were used in the Geology gallery against heritage norms. Tastes differ.

CHAPTER VIII

DEVĀSRAYA MANDAPA OF THIRU *THIYAGARAJA SWAMY* TEMPLE AT *TIRUVARUR*

Note

In order to give an idea of the elaborate work required for preparation of estimates, a sample of a work which was proposed to be done by a donor but not carried out is given below Of course, the estimates are of historical interest only since costs have escalated manifold since these estimates were prepared Preparatory work by way of sticking glass tell-tales on the cracked portions like ceiling granite slabs, capitals and corbels and architraves of pillars was done for a period of 9 months over the monsoon and dry periods to see if the settlement was active or not

This information on costs is not normally parted with, but it has been done here in the tradition of the great *Vaishnava Guru*, *Ramanuja* who shouted out aloud the privately imparted mantra for his personal *moksha* or salvation from the top of the temple tower of *Tirukoshtiyur* so that the general public could also attain salvation This information will be useful to the scholars and archaeologists of the future This estimate has been prepared based on the directions and archaeological prescription given by this writer to Thiru M.G.Chella Pillai, Archaeological Engineer, free of cost

Measurements

1	Removing the dead and wornout plastering and replastering with combination mortar 1:1:5, 20mm thick, curing etc., complete.			
	Southern end of Terrace	1x1x11.35x7.10	=	80.59m²
	North Portion	1x1x63.00x42.00	=	2646.00m²
	Total		=	2726.59m²
	Deduct Area for Water tightening item (2) below		=	(-) 601.40m²
				2125.19m²

or say = 2125.00m²

2 Removing the decayed and leaky weathering course materials (brick jelly concrete) over the Terrace in eastern side of 1000 pillared mandapa and throwing away the debris to a far off place etc , complete

Eastern side of Terrace	1x1x42 50x17 20		=	731.00m²
Deduct Raised portion	1x1x5 55x5 40	(-) 29.97m²		
	1x1x12 90x5 40	(-) 69.66m²		
	1x1x5 55x5 40	(-) 29.97m²		
				129.60m²
				601.40m²

or say = 601.00m²

3. Water tightening the Terrace with 0 15cm thick new Brick Jelly concrete in pure lime mixed with gallnut and jaggery water paving with 2 layers of flat tiles in cement mortar 1:3 mixed with water proof compound and plastering the top with combination mortar 1 1:5, 20mm thick curing etc , complete

Area worked out as above item 2 = **601.00m²**

4 Removing the entire weathering course materials for removing the broken stone ceiling slabs of the Terrace including collecting and throwing away the debris to a far off place etc. complete

East Portion of Terrace for the ceiling slabs

1x1x6 00x3 00	=	18 00m²
1x1x4 00x3 00	=	12 00m²
1x1x1 20x3 00	=	3 60m²
		33.60m²

or say = 34.00m²

5. Carefully removing the Broken ceiling slabs bringing them down to the ground level including proper support to the ceiling etc. complete.

East Portion of Terrace broken slabs

1x1x5.50x2.55	=	14.03m²
1x1x3.45x2.55	=	8.80m²
1x1x1.00x2.55	=	2.55m²
		25.38m²

6. Fixing of new stone ceiling slabs over the Terrace portion including erection of scaffolding etc , complete

Area Worked out of above item 5 = **25.38m²**

7 Mending the broken beams with "I" section girders and Araldite etc., including cutting of crews etc , complete.

At 1000 Pillared mandapa = **23Nos.**

8. Water tightening the terrace (after paving the new stones ceiling slabs) to a thick of 0.45 cm Brick Jelly concrete in pure lime mixed with gallnut and jaggery water paving two layers of flat tiles in cement mortar 1:3 mixed with water proof compound and plastering the top with combination mortar 1:1.5, 20 mm thick, curing and colour matching etc , complete

Area worked out as above item No. 4 = **34.00m²**

9. Carefully removing the decayed and womout lime plaster from the rear side of the parapet wall and replastering with combination mortor 1:1.5, 20mm thick including curing and colour matching etc , complete.

Rear side of Parapet wall

Front	1x1x56.20x1.20	=	67.44m²
East	1x1x45.00x1.20	=	54.00m²
West	1x1x5.40x1.20	=	6.48m²
Side of Raised portion	4x2x5.55x0.45	=	19.98m²
East and West	4x2x5.40x0.45	=	19.44m²
	2x2x12.90x0.45	=	23.22m²
	2x2x5.40x0.45	=	9.72m²
Middle	2x1x40.00x0.50	=	40.00m²
	2x1x5.40x0.45	=	4.86m²
			245.14m²

or say = 245m²

10. Plastering the brick flooring with combination mortar 1:1:5, 20mm thick including racking out the brick joints etc., complete

East of Thiyagaraja medai	1x1x13.80x19.70	=	271.86m²	
Deduct upstair steps	1x1x5.10x1.60	=	(-)8.16m²	
Deduct pillars	1x40x0.37x0.37	=	(-)5.47m²	
Add west of Thiyagaraja medai	1x1x17.20x2.55	=	189.20m²	
	1x1x4.70x2.55	=	11.99m²	
Deduct Pillars	1x30x0.37x0.37	=	(-)4.11m²	
	1x2x0.37x0.37	=	(-)0.27m²	
Add Rear side of Thiyagaraja medai	1x1x9.55x12.00	=	114.60m²	
Deduct pillars	1x12x0.30x0.30	=	(-)1.08m²	
			(-) 19.09	
				587.65m²
				(-) 19.09m²
				568.56m²

or say = 569m²

11. Mending the broken portion of ornamental parapet wall over the mandapa stucco work and after removing the dead plaster and plastering with combination mortar 1:1:5 as Base coat and finishing with hand grinded lime mortar paste (Theervai) 1:1, curing, erection of scaffolding etc., complete

Front Portion of Mantapa			
(ie) South	1x1 1/7 x56.20x1.50	=	126.45m²
East	1x1 1/2 x45.00x1.50	=	101.25m²
West	1x1 1/2 x5.40x1.50	=	12.15m²
Chajja Portion	1x1x106.60x1.60	=	170.56m²
(56.20+45.00+5.40)			410.41m²

or say = 410m²

12. Mending and reproducing the broken brick chajja with similar type of bricks including erection of scaffolding etc., complete

One item

13. Dismantling the uneven, sunken damaged stone flooring around Thiagaraja Medai and disposing the same to a far off place etc , complete

Thiyagaraja Medai	1x1x7.80x12.00	=	93.60m²
Deduct Pillars	1x1x0.35x0.50	=	(-) 1.75m²
			91.85m²

or say = 92.00m²

14. Laying of new stone flooring over a bed of brick jelly lime concrete 1:2 and set in cement mortar 1:4 and then pointing the stone joints with cement mortar 1:3 curing etc , complete

Area worked out as above item 13 = **92.00m²**

15. Providing wooden door to the open way to the terrace including locking arrangements and painting etc , complete

One item

16 Dismantling the accretionary brick with mud wall and supporting the beams and broken ceiling slabs around the Thigaraja medai and throwing away the debris to a far off place etc , complete

One item

17. Earth work excavation for study of foundation details of the pillars and wall if necessary strengthening the foundation to avoid further sinking of pillars etc , complete

One item

18 Desilting the existing ancient drainage for proper flow of rain water from the temple premises

One item

19. Supply of scaffolding materials and other tools and plants necessary for execution of works

One item

Repairs to the *Devāsraya Mandapa* of Shri. Thiyagaraja Swamy Temple, Thiruvarur.

Suh Data

a) Dry River Sand – $1m^3$

$1m^3$ Dry River Sand supplied at site @ **Rs. 500/m^3**

b) Lime (slaged and screened) – $1m^3$ (Kankar Lime)

$1m^3$ cost of lime supplied at site @ **Rs. 850/m^3**

(Purchase from Pollachi)

c) 20mm size Brick Jelly – $1m^3$

$1m^3$ cost of Brick Jelly supplied at site @ **Rs. 550/m^3**

d) Pressed tiles – 1 No

20cm size pressed tiles @ Rs. 4.50/1 No.

Convey Charges etc Rs. 0.50 **Rs. 5.00/1 No.**

e) Flooring stone slabs 10cm (ave) thick (ave) – $1m^2$

Size 0.90 to 60 cm lengths

and 0.45 to 30 cm width

$1m^2$ Flooring slabs purchased from Pudukottai L R	=	Rs 400.00
3.50 mm stone Mason (Rs. 170/-)	=	Rs 595.00
for neatly dressing the top and cutting the sides		
1 rft chistle rod @ Rs. 35/rft	=	Rs 35.00
5kg charcoal @ Rs. 8/k	=	Rs 40.00
0.50 store mason for @ Rs. 170	=	Rs. 85.00
for sharpening of chistle		
rod and blowing the blower		
L S Cost of Cotton String, Rod	=	Rs. 5.00
		1160.00/m^2

f) Cement - kg

1 Bag cost of cement	=	Rs 160.00
1 Bag conveyance from shop	=	Rs. 5.00
including loading and unloading		Rs 165.00/50kg

Rate /Rs. 3.30/Kg

f) Cement mortar 1 : 3 – 1m³

1m³ dry river sand @ Rs. 500/m³	Rs 500.00
480 kgs cement @ Rs 3.30/kg	Rs 1584.00
1m³ mixing charges	Rs 19.00
L.S. conveyance of water	Rs 7.00
Total	Rs 2110.00/m³

Rate/Rs. 2110/m³

g) Cement mortar 1 : 4 – 1m³

1m³ dry river sand @ Rs. 500/m³	Rs 500.00
360 kgs cement @ Rs. 3.30/kg	Rs 1188.00
1m³ mixing charges	Rs. 19.00
L.S. conveyance of water	Rs. 8.00
Total	Rs 1715.00/m³

Rate/Rs. 1715/m³

h) Combination mortar 1:1:5 – 1m³

1m³ dry river sand @ Rs 500/m³	Rs. 500.00
288 kg cement @ Rs. 3.30/kg	Rs 950.40
0.20m³ lime @ Rs. 850/m³	Rs 170.00
1m³ mixing charges	Rs 19.00
1m³ grinding charges	Rs 48.00
L.S. conveyance of water	Rs 14.60
2 kg galnut @ Rs. 30kg	Rs 60.00
1 kg jaggery @ Rs 18/kg	Rs 18.80
Total	Rs 1780.00/1m³

Rate/Rs. 1780/1m³

i) Brick jelly concrete in pure lime – 1m3

0-90m³ Brick jelly 20mm size @ Rs 550/m3	Rs 495.00
0.45 m³ lime @ Rs 850/m3	Rs 382.50
0.18 nos Mazdoor @ Rs. 160/each	Rs 28.80
1.77 nos Mazdoor I @ Rs. 100/each	Rs 177.00
1.41 nos Mazdoor II @ Rs 60/each	Rs 84.60
0.5 nos Mazdoor II @ Rs. 60/each	Rs 30.00
for conveyance water15% extra labour to work cures the terrace and lifting of Brick jelly to the Terrace	Rs 43.56
L.S. Sundries	Rs 8.54
Total	Rs. 1250.00

Rate/Rs. 1250/m³

j) Plastering with combination mortar 1:1.5, 20mm thick-10m²

0.22m³ combination mortar 1:1.5 @ Rs. 1780/m³ (vide sub data "h")	=	Rs. 391.60
2.20 nos Mason I @ Rs. 160/each	=	Rs. 352.00
0.50 nos Mazdoor I @ Rs. 100/each	=	Rs. 50.00
3.20 nos Mazdoor II @ Rs. 60/each	=	Rs. 192.00
15% Extra labour of work over the Terrace	=	Rs. 89.10
0.40nos Mazdoor II @ Rs. 60/each for Conveyance of water	=	Rs. 24.00
L.S. Cost of colouring materials, water proof Compound, sponge etc	=	Rs. 21.30
Total		Rs.1120.00/10m²

Rate/Rs. 1120/10m²

k) Special lime mortar 1:1 – 1m³

1.50m³ dry river sand @ Rs. 500/m³	=	Rs 750.00
0.80m³ lime @ Rs. 850/m³	=	Rs 680.00
1m³ mixing charges	=	Rs 19.00
1m³ grinding charges	=	Rs 48.00
Add water juice of		
10kg Jaggery @ Rs. 18/kg	=	Rs 180.00
10kg Gulnut @ Rs. 30/kg	=	Rs 300.00
L.S. Sundries		Rs 3.00
Total		Rs 1980.00/m³

Rate/Rs. 1980/m³

l) Special Hand Grinded mortar paste – 1m³

1m³ cost of lime mortar 1:1 @ Rs. 1980/m³	=	Rs 1980.00
Labour for Grinding the mortar		
30nos Mazdoor I @ Rs. 100/each	=	Rs 3000.00
30nos Mazdoor II @ Rs. 60/each	=	Rs 1800.00
L.S. Cost of patti blade	=	Rs 20.00
Total		Rs 6800.00/m³

Rate/Rs. 6800/m³

m) Applying thin coat of Hand grinded lime mortar paste over the plastered surface in the minute curvings and stucco figures over parapet wall

0.06m³ Hand grinded lime mortar paste @ Rs. 6800/m³	=	Rs. 408.00
vise sub data "L"		
3.50kg white cement @ Rs. 15/kg	=	Rs. 52.50
4.50nos sthapathy Mason @ Rs. 175/each	=	Rs. 787.50
2nos Mazdoor 1 @ Rs. 100/each	=	Rs. 200.00
30nos Egg. @ Rs. 1.50/-	=	Rs. 45.00
L.S. Cost of Paint Brush	=	Rs. 50.00
15% Extra labour to work over the Terrace	=	Rs. 231.00
L.S. Sundries	=	Rs. 6.00
Total		Rs.1780.00/m²

Rate/Rs. 1780/m²

n) Ceiling slabs cutting and dressing from availability stones – 1m²

Size of stone ceiling slab 1x1x2.55x0.40	=	1.02m²
(0.28 cm thick) or say	=	1m²
(Huge no. of stones available at site at various size. These stones can be used after cutting in to required sizes)		
Labour for cutting of ceiling slabs from Big size stone		
1nos Mason @ 160/each	=	Rs. 160.00
3nos Mazdoor 1 @ Rs. 100/each	=	Rs. 300.00
For selecting and conveying of Big Stone from stocky place for Dressing		
For neatly dressing the top and cutting the sides for proper jointing		
10nos Mason @ Rs. 160/each	=	Rs.1600.00
1.5 rft chistle Rod @ Rs. 35/rft	=	Rs. 52.50
5kg char coal @ Rs. 9kg	=	Rs. 45.00
L.S. for Red kavi, cotton, sponge etc.,	=	Rs. 32.50
Total		Rs.2190.00/m²

Rate/Rs. 2190/m²

o) Pointing the stone joints with cement mortar 1:3 – 10m²

0.06m³ cement mortar 1:3 @ Rs. 2110/m³	=	Rs. 126.60
1.60 nos Mason I @ Rs. 160/each	=	Rs. 256.00
0.50nos Mazdoor I @ Rs. 100/each	=	Rs. 50.00
1.10m Mazdoor II @ Rs. 60/each	=	Rs. 66.00
L.S. Cost of Colour matching	=	Rs. 11.40
Total		Rs. 510.00/10m²

Rate/Rs. 510/10m²

Spl. Repairs to *Devāsraya Mandapa* of Shri. Thiyagaraja Swamy Temple, Thiruvarur.

Detailed Data

1 Removing the dead and womout plastering and replasting with combination mortar 1:1:5, 20mm thick curing etc., complete.

Unit – 10m²

10m² clean removal of dead plaster from the Wall/Terrace @ Rs. 130/10m²	=	Rs. 130.00
0.50nos Mazdoor I @ Rs. 100/each	=	Rs. 50.00
(for collecting the debris and cleaning the area for replasting)		
0.50nos Mazdoor II @ Rs. 60/each	=	Rs. 30.00
for disposing the debris to a far off place		
10m² plastering with combination mortar 1:1:5, 20mm thick (vide sub data "j") @ Rs. 1120/10m²	=	Rs. 1120.00
L.S. cost of baskets, chistle rods etc.,	=	Rs. 15.00
Total		Rs. 1345.00/10m²

Rate/Rs. 1345/10m²

2. Removing the decayed and leaky weathering course materials (brick, jelly, concrete) over the Terrace in eastern side of 1000 pillared mantapa, and throwing away the debris to a far off place etc., complete. **Unit – 1m²**

0.15m³ dismantling/removing the weathering course @		Rs	70/m³
	=	Rs.	10.50

(1.00x1.00x0.15 thick average)

Extra labour requires to collects the debris and convey by head load fromTerrace to ground level for disposing the debris

0.25 nos Mazdoor I @ Rs. 100/each	=	Rs	25.00
0.10nos Mazdoor II @ Rs. 60/each	=	Rs	6.00
L.S. Cost of baskets, chistle rods, etc.,		Rs	0.50
Total		Rs	42.00/m²

Rate/Rs. 42.00/m²

3 Water tightening the Terrace with 0.15cm thick new Brick Jelly concrete in pure lime mixed with gallnut and jaggery water paving with 2 layers of flat tiles in cement mortar 1:3 mixed with water proof compound and plastering the top with combination mortar 1:1:5, 20mm thick curing and colour matching etc., complete.

0.15m³ Brick Jelly Concrete, in pure lime @ Rs. 1250/m³ (vide sub date "I")	=	Rs	187.50
0.027m³ Cement mortar 1:3 @ Rs. 2110/m³ (vide sub data "f")	=	Rs	56.97
0.027m³ flat tiles @ Rs. 900/1000 nos (L.R. Supplied at site)	=	Rs	81.00
Purchased from Thruvannamalai			
0.25 kg Galnut @ Rs. 30/kg	=	Rs	7.50
0.25 kg Jeggary @ Rs. 18/kg	=	Rs	4.50
0.10 kg water proof compound etc., 100/kg	=	Rs	10.00
0.22 nos Mason @ Rs. 160/each	=	Rs	35.20
C/o		Rs	382.67

B/F	=	**Rs. 382.67**
0 22 nos Mazdoor I @ Rs 100/each	=	Rs 22.00
1m² plastering with combination mortar 1 1:5, 20mm thick etc , 1120/10² (vide sub data "j")	=	Rs 112.00
Extra Labour for beating the brick jelly Concrete with wooden knife and pouring of Kadukkai and Jaggery water juice for proper strength		
0 20 nos Mazdoor I @ Rs 100/each	=	Rs 20.00
Extra Labour for lifting of materials (Flat Tiles) to Terrace		
0 10 nos Mazdoor II @ Rs 60/each	=	Rs 6.00
L S Sundries for wooden knife etc ,	=	Rs. 2.33
Total		Rs. 545.00

Rate/Rs. 545/1m²

4. Removing the entire weathering course materials for removing the broken stone ceiling slabs of the Terrace including collecting and throwing away the debris to a far off place etc , complete. **Unit – 1m²**

0 50m³ Dismantling the weathering course materials @ Rs 70/m³ (1 00x1 00x0 50 thick average)	=	Rs 35.00
Extra Labour for collecting the debris and disposing the same		
0.25 nos Mazdoor I @ Rs 100/each	=	Rs 25.00
0.15nos Mazdoor II @ Rs 60/each	=	Rs 9.00
L S cost of baskets etc ,	=	Rs 1.00
Total		Rs 70.00/m²

Rate/Rs. 70.00/m²

5. Carefully removing the broken stone ceiling slabs and bring them down to the ground level including proper support to the ceiling etc , complete

Unit – 1m²

1m² Removing the stone ceiling Slab from Terrace		
0 20m Stone Mason I @ Rs 160/each	=	Rs 32 00
I 50m Mazdoor I @ Rs 100/each	=	Rs 150 00
L S Cost of coir rope etc ,	=	Rs 8 00
Total		Rs 190 00/m²

Rate/Rs. 190.00/m²

6. Fixing of new stone ceiling slab over the Terrace Portion including erection of scaffolding etc , complete

Unit – 1m²

1m² cost of ceiling slabs @ Rs 2190/m² (vide slab data "n")	=	Rs 2190 00
1m² conveyance from southern corner to 1000 pillared mandapa by using wooden rollers (300 meters)		
2 nos Mazdoor I @ Rs 100/each	=	Rs 200 00
Labour Provision for lifting from ground level to Terrace and fixing the stone inposition.		
0 15m stone Mason @ Rs 160/each	=	Rs 24 00
3 nos Mazdoor I @ Rs 100/each	=	Rs 300 00
L S Cost of mortar etc ,	=	Rs 36 00
Total		Rs 2750 00/1m²

Rate/Rs. 2750.00/1m²

7) Mending the broken beam with I section girders and Araldite etc., including cutting of crew etc., complete.

Unit – 1 No.

Size of Beam 2.50x0.43x0.40

Cutting of crew at both sides of beam for proper fixing of "I" section girder. This work was very slow nature and also to work over the ceiling portion is in portion very difficult one Hence the provision is necessary. This is only for purpose and the may vary from beam to beam and strength of beam

30nos stone Mason @ Rs 160/each	=	Rs 4800.00
(For one side cutting of crew for fixing the "I" section 30nos Mason is necessary for both side 2x15 = 30 nos)		
3 nos Mazdoor I @ Rs. 100/each for Erection and dismantling of scaffolding for conveniently lifting of stone mason near by beam for work.	=	Rs. 300.00
L.S. cost of 2 nos "I" section girder	=	Rs 1500.00
L.S. cost of Fine sand, liquid of Araldite and hardner	=	Rs 300.00
This special sand and liquid only available at Chennai		
4rft chistle rod @ Rs. 35/rft	=	Rs 140.00
10kg charcoal @ Rs. 9/kg	=	Rs 90.00
Total		Rs 7130.00/1No

Rate/Rs. 7130/1No

8 Water Tightening the Terrace (after paving of new stone ceiling, slabs) to a thick of 0.45 cm thick new brick jelly concrete in pure lime mixed with gallnuts and Jaggery water paving with 2 layers of flat tiles in cement mortor 1:3 mixed with water proof compound and plastering the top with combination mortor 1:1:5, 20 mm thick, curing and colour matching etc , complete

Unit – 1m²

1m² Water tightening Terrace @ Rs. 545/m² (vide item no 3 of main data worked as colour)	=	Rs. 545.00
Deduct cost of 0.15m³ Brick, Jelly concrete in pure lime @ Rs. 1250/m³	=	Rs. 187.50
	=	Rs. 357.50
Add cost of 0.45m³ Brick, Jelly concrete in pure lime @ Rs. 1250/m³	=	Rs. 562.50
Total		Rs.920.00/m²

Rate/Rs. 920.00/m²

9 Carefully removing the decayed and wornout lime plaster from the rear side of the parapet wall and replastering with combination mortar 1:1:5, 20mm including curing colour matching etc., complete.

Unit – 10m²

10m² carefully removing the decayed and dead plaster from wall and replastering with combination mortar 1:1:5, 20mm thick, @ Rs 1345/10m²
Rate worked out under item No. 1 above

Rate/Rs. 1345/10m² **Rs. 1345/10m²**

10 Plastering the Brick flooring with combination mortar 1:1:5, 20mm thick including racking out the brick joints etc , complete

Unit – 10m²

10m² Racking out the brick joints for proper strength of plastering and cleaning the brick surface with fresh water		
1no Mazdoor I @ Rs. 100/each	=	Rs. 100.00
0.50 nos Mazdoor II @ Rs. 60/each	=	Rs. 30.00
0.22m³ combination mortar 1:1:5 @ Rs. 1780/1m³	=	Rs. 391.60
C/o		Rs. 521.60

B/F	=	**Rs. 521.60**
2.20 m^3 Mason I @ Rs. 160/each	=	Rs. 352.00
0.50nos Mazdoor I @ Rs. 100/each	=	Rs. 50.00
3.20nos Mazdoor II @ Rs. 60/each	=	Rs. 192.00
0.40 nos Mazdoor II @ Rs. 60/each for conveyance of water and curing etc.,	=	Rs. 24.00
L.S. cost of colouring materials, etc.,	=	Rs. 10.40
Total		Rs. 1150.00/10m^2

Rate/Rs. 1150.00/10m^2

11) Mending the broken portion of ornamental parapet wall over the mantapa stucco work and after removing the dead plaster and plastering with combination mortar 1:1:5 as base coat and tighning with Hand grinded lime mortar paste 1:1, (Theervai) curing, erection of scaffolding etc., complete

Unit – 10m^2

10m^2 clean removal of dead plaster from the ornamental portion		
1.50nos Mazdoor I @ Rs. 100/each	=	Rs. 150.00
1.00nos Mazdoor II @ Rs. 60/each	=	Rs. 60.00
Base Plastering with combination mortar 1:1:5, 20mm thick @ Rs. 1120/10m^2 (vide sub data "j")	=	Rs. 1120.00
10nos flaste tiles @ Rs. 0.90/1 no	=	Rs. 9.00
10nos Terrace bricks @ Rs. 1.5/1no	=	Rs. 15.00
1.50 nos sthapathy mason @ Rs. 175/each	=	Rs. 262.50
For Mending the broken portion of ornamental features stucco figures etc.,		
10 m^2 applying thick coat of hand grinded lime mortar paste @ Rs. 1780/10m^2 (vide sub data "m")	=	Rs. 1780.00
C/o		Rs. 3396.50

B/F	=	**Rs. 3396.50**
Exection of scaffolding at every stage with available scaffolding materials for execution of work		
2 nos Mazdoor I @ Rs. 100/each	=	Rs 200.00
L.S. sharping of T & P's	=	Rs 13.50
Total	=	Rs 3610.00/10m²

Rate/Rs. 3610.00/10m²

12 Mending and reproducing the broken brick chajja with similar type of bricks including erection of scaffolding etc., complete

Unit – One Item

(Missing portion of chajja 2.30x1.50m²)		
500 nos spl. Bricks @ Rs. 1200/1000 Nos	=	Rs. 600.00
3 nos sthapathy Mason @ Rs. 175/each	=	Rs 525.00
1 no Mazdoor I @ Rs. 100/each	=	Rs. 100.00
L.S. Cost of rich lime mortar 1:1	=	Rs 300.00
1 no Mazdoor II @ Rs. 60/each	=	Rs 60.00
L.S. Cost of Rods	=	Rs 65.50
Total		Rs 1650.00/one item

Rate/Rs. 1650/one item

13. Dismantling the uneven, sunken damaged Thiyagaraja medai and disposing stone looking around the same to a far off place etc., complete

1m² (1.00x1.50x0.30) or 0.3m³ dismantling stone this work @ Rs. 100/m³	=	Rs 30.00
0.50 no Mazdoor I @ Rs. 100/each (For conveying the stones to the southern outer pragara 300 mts)	=	Rs 50.00
L.S. cost of chistle, rod, shapening of T & P's	=	Rs 5.00
Total	=	Rs 85.00/m²

Rate/Rs. 85/m²

14 Laying of new stone flooring over a bed of brick jelly lime concrete 1:2 and set in cement mortar 1:4 and pointing the stone joints with c m 1:3, curing etc , complete

1m³ cost of new flooring stone slab @ Rs 1160/m² (vide sub data "e")	=	Rs. 1160.00
0.10m³ (1.50x1.00x0.10) Brick, Jelly concrete in pure lime, @ Rs 1250/m³ (vide sub data "i")	=	Rs 125.00
0.037m³ cement mortar 1:4 @ Rs 1715/m³	=	Rs 63.45
0.22nos Mason @ Rs 160/each	=	Rs 35.20
0.22nos Mazdoor I @ Rs 100/each	=	Rs 22.00
0.11nos Mazdoor II @ Rs 60/each	=	Rs. 6.60
1m² pointing the stone joints with c m 1:3 @ Rs 510/10m² sub data "o"	=	Rs. 51.00
0.10 rft Chistle rod @ Rs 35/	=	Rs 3.50
1kg char coal @ Rs 9/kg	=	Rs 9.00
L S Sundries cost of coir rope	=	Rs 14.25
Total		Rs 1490.00/1m²

Rate/Rs. 1490/m²

15 Providing wooden door to the open way to the Terrace including locking arrangements and painting etc , complete

Unit – one item

(Size of door 0.90x1.65m)
(3' x5½)

Door Frames				
Vertically	2x5½ x4"x3"	=	0.92 cft	
Horizontally	2x3½x4"x3"	=	0.58 cft	
			1.50 cft	1.50 cft
Wooden frame to door shutters				
Horizantly	3x3'x4"x1½	=	0.37 cft	
Vertically	3x5½ x4"x1½	=	0.68 cft	
		=	1.05 cft	1.05 cft
				2.55 cft
Add 10% wastage				0.25 cft
C/o				2.80 cft

B/F	=	**2.80 cft**

Wooden plants to door shutter 1" thick

4x11/4x2$^{1/2}$	=	12.50 sft
2.80 cft Illupai wood scantling @ Rs. 600/cft	=	Rs. 1680.00
12.50 sft – Illuppai wooden planks @ Rs. 40/sft	=	Rs. 500.00
8nos Carpenter @ Rs.140/each	=	Rs. 1120.00
4nos Mazdoor I @ Rs. 100/each	=	Rs. 400.00
To assist the carpenter for planning work		
L.S. Cost of 2 nos Tower bolt	=	Rs. 100.00
L.S. Cost of 1 no Aldrop	=	Rs. 150.00
3.71m^2 Painting with two coats of enamel paint over a primary coat @ Rs. 500/10m^2	=	Rs. 185.50
L.S. cost of fevicol, nails, screw etc	=	Rs. 64.50
Total		Rs.4200.00/1no

Rate/Rs. 4200.00/1 no

16) Dismantling the accretionary brick with mud wall to the existing stone grill opening around the Thyagaraja medai and as supports to the cracked beams and ceiling slabs, and throwing away the debris to a far off place etc , complete

Unit – one item

L.S. Dismantling the brick walls, for broken stone pillars and supporting broken beam, ceiling slabs, sunlight windows wall etc , and throwing away the debris to a far off place by lorry.

Rs. 10,000/-

Rate/Rs. 10,000/one item

17) Earth work excavation for study of foundation details to the pillars and wall if necessary strengthening the foundation to avoid further sinking of pillars etc ,

This item includes for experimental basis for study of the foundation details, nature of the soil etc ,

Hence the Lumpsum provision was included = Rs. 5000/-

Rate/Rs. 5000/one item

18) Desilting the existing ancient drainage for proper disposal of rain water from the temple premises (alround the mantapa)

One item

The existing ancient drainage is mostly filled with silt deposit to a hight of 1.20m and to a length of apx, 350 mtrs, Due to this the rain water is now stagnated adjacent area to the 1000 pillared mantapa The drainage is also very narrow one and will not be possible to clean the accumulated silt easily. For estimate purpose now lumpsum amount is provided The expenditure will be restricted to as per actuals. (This includes repairs if any required to the existing channel)

L.S. Rs.25,000/-

19) Supply of scaffolding materials for excavation works one item

200 nos Casurina poles @ Rs. 80/1 no (Big size)	=	Rs 16000.00
100m Bamboo poles @ Rs. 70/1 no	=	Rs 7000.00
400 sft (50 nos) country wood planks @ Rs. 25/sft	=	Rs 10000.00
150kg Coir string @ Rs. 15/kg	=	Rs 2250.00
1500nos co.coconut leaves (for covering the stucco work) @ Rs. 150/100 nos	=	Rs 2250.00
L.S. Cost of palai string	=	Rs 200.00
30nos wooden rollers @ Rs. 30/1 no	=	Rs 900.00
6nos Lime grinding stone @ Rs. 400/1 no	=	Rs 2400.00
2nos Stone cutting Blade @ Rs. 1200/1 no	=	Rs 2400.00
2 nos well pully @ Rs. 75/1 no	=	Rs 150.00
6nos Coir rope @ Rs. 75/1no (10mts)	=	Rs 4500.00
L.S. Hire charges of pully blocks (for lifting of ceiling slab etc ,)	=	Rs 1000.00
20 nos Plastic pot @ Rs. 40/no	=	Rs 800.00
20 nos Plastic bucket @ Rs. 90/1no	=	Rs. 1800.00
30 nos Plastic Mug @ Rs. 15/1no	=	Rs 450.00
2nos 100 litres water drum @ Rs. 150/1no	=	Rs 300.00
		Rs 52400.00

Rate/Rs. 52,400/one item

***Devāsraya Mandapa* of Thiru. Thyagaraja Swamy Temple at Thiruvarur.**

ABSTRACT

			Rs. P.
1	Removing the dead and wornout Plastering and replastering with combination mortar 1:1:5, 20mm thick, curing etc., complete **2125 m² @ Rs. 1345/10 m²**	=	**2,85,813.00**
2	Removing the decayed and leaky weathering course materials (Brick, Jelly. Concrete) over the Terrace in Eastern Side of 1000 pillared mantapa, and throwing away the debris to a far off place etc., completes **601m² @ Rs. 42/m²**	=	**25,242.00**
3	Water Tightening the Terrace with 0.15 cm thick new brick jelly concrete in pure lime mixed with gallnuts and Jaggery water paving with two layers of flat tiles in cement mortor 1:3 mixed with water proof compound and plastering the top with combination mortar 1:1:5, 20 mm thick, curing etc., complete **601m² @ Rs. 545/m²**	=	**3,27,545.00**
4	Removing the entire weathering course materials for removing the broken stone ceiling slabs of the Terrace including collecting and throwing away the debris to a far off place etc. complete. **34m² @ Rs. 70/m²**	=	**2380.00**
	C/o		**6,40,980.00**

			Rs. P.
	B/F	=	6,40,980.00
5	Carefully removing the Broken ceiling slabs bringing them down to the ground level including proper support to the ceiling etc , complete **25.38m² @ Rs. 190/m²**	=	4,822.00
6	Fixing of new stone ceiling slabs over the Terrace portion including erection of scaffolding etc., complete **25.38m² @ 2750/m²**	=	69,795.00
7	Mending the broken beams with "I" section girders and Araldite etc., including cutting of crew's etc , complete **23Nos @ Rs. 7130/- each**	=	1,63,990.00
8	Water tightning the terrace (after paving the new stones ceiling slabs) to a thick of 0.45 cm Brick Jelly concrete in pure lime mixed with gallnut and jaggery water paving two layers of flat tiles in cement mortar 1:3 mixed with water proof compound and plastering the top with combination mortar 1:1:5, 20 mm thick, curing and colour matching etc , complete **34m² @ Rs. 920/m²**	=	31,280.00
9	Carefully removing the decayed and wornout lime plaster from the rear side of the parapet wall and replastering with combination mortar 1:1:5, 20mm thick including curing and colour matching etc , complete **245m² @ Rs. 1345/10m²**	=	32,952.00
	C/o		9,43,819.00

			Rs. P.
	B/F	=	**9,43,819.00**
10.	Plastering the brick flooring with combination mortar 1:1 5, 20mm thick including racking out the brick joints etc., complete **569m² @ Rs. 1150/10m²**	=	**65,435.00**
11.	Mending the broken portion of ornamental parapet wall over the mandapa stucco work and after removing the dead plaster and replastering with combination mortar 1.1:5 as Base coat and finishing with hand grinded lime mortar paste (Theervai) 1 1, curing, erection of scaffolding etc., complete **410m² @ Rs. 3610/10m²**	=	**1,48,010.00**
12.	Mending and reproducing the broken brick chajja with similar type of bricks including erection of scaffolding etc., complete **One item – 1 item @ Rs. 1650**	=	**1,650.00**
13	Dismantling uneven, sunken damaged stone flooring around Thiagaraja Medai and disposing the same to a far off place etc., complete **92m² @ Rs. 85/m²**	=	**7820.00**
14	Laying of new stones flooring over a bed of brick jelly lime concrete 1:2 and set in cement mortar 1:4 and then pointing the stone joints with cement mortar 1:3 curing etc., complete. **92m² @ Rs. 1490/m²**	=	**1,37,080.00**
	C/o		**13,03,814.00**

			Rs. P.
	B/F	=	**13,03,814.00**
15.	Providing wooden door to the open way to the terrace including locking arrangements and painting etc , complete.		
	One item – 1 Item @ Rs. 4200	=	**4,200.00**
16.	Dismantling the accretionary brick in mud wall and supporting the beams and broken ceiling slabs around the thigaraja medai and throwing away the debris to a far off plate etc., complete		
	One item – 1 item @ Rs. 10,000	=	**10,000.00**
17.	Earth work excavation for study of foundation details of the pillars and wall if necessary strengthening the foundation to avoid further sinking of pillars etc , complete.		
	One item – 1 item @ Rs. 5000	=	**5,000.00**
18	Desilting the existing ancient drainage for proper flow of rain water from the temple premises		
	One item – 1 item @ 25000	=	**25,000.00**
19.	Supply of scaffolding materials and other tools and plants necessary for execution of works		
	One item – 1 item @ 52,400	=	**52,400.00**
20.	Contingences for unforesean expenditure@ 2% or	=	**27,586.00**
	Total		**14,28,000.00**

(Sd) M G. Chella Pillai
Archaeological Engineer

CHAPTER IX

CONSERVATION OF THE SCULPTURES OF THE *AMARAVATI* GALLERY

Conservation

The British have taken about 300 of the best *Amaravati* pieces out of India through Madras port in the 19th Century. The issue of their return to the land of their origin on the basis of the precedent of the return of the Australian artefacts of the Brough collection to the Chennai Museum was also raised. The British are highly unlikely to return anything. The site museum of the Archaeological Survey of India at Amaravati has a good collection.

An impression had been created that that the *Amaravati* artefacts were deteriorating in the Government Museum, Chennai. The level of the land and roads has risen in the last 130 years after these sculptures were embedded in the walls. This has created a problem of water absorption due to osmosis in the delicate limestone sculptures. This problem was noticed even in the 1970s. In the 1980s, there was a programme to remove them at a cost of Rs. 25 Lakhs. Considering their delicate nature, they were not touched.

Thiru K.T. Narasimhan inspected the *Amaravati* Gallery on 2nd August 2000 to assess the physical condition of the following buildings along with me. He gave a note, which is reproduced below (the full note can be seen in the Chapter under conservation of Museum Buildings as it mainly deals with the National Art Gallery).

Reorganisation of the *Amaravati* Gallery

History. The Egmore Museum is a multipurpose Museum it houses antiquities of various disciplines. The building itself is more than 200 years old. Here in the Archaeology section, the *Amaravati* Gallery (sculpture gallery) is unique and most famous for its sculptural art. The *Amaravati Stupa* at *Amaravati* in Guntur District, Andhra Pradesh was constructed during the 3rd Century BC by a *Satavahana* who was the contemporary of Emperor *Asoka*. Greenish lime stone was used in the *stupa's* construction.

During the first decade of the last century, the then District Collector of Krishna District in Andhra Pradesh, followed by many archaeologists conducted excavations at *Amaravati stupa* site and brought out many invaluable lime stone sculptures such as drum slabs, dome slabs, lotus

medallion, etc which were part of the *Mahachaitya* of the *Amaravati Stupa* They were brought to Madras when it was under the Madras Province

The said sculptures are on display since 1879, in Government Museum Egmore, Chennai Unfortunately they are embedded on the walls and some screen walls are made within the gallery in which they are permanently mounted' Thus ends his notes of inspection

Removal of Some of the Deteriorating Embedded Artefacts

In 2001 AD, there was an International Seminar on Conservation of Stone Objects, the first to be organised by the Government Museum, Chennai in its 150 years of its existence Also, I attended a Seminar on Conservation of Stone Objects held at the IIT, Chennai organised by the German Max Mueller Bhavan and presented a paper I was also a member of the Committee set up by IIT, Chennai to popularise the use of Power Tools in conservation

In the International Seminar on Stone Conservation the methods of conservation of stone objects like granite sculptures and delicate limestone sculptures like the *Amaravati* sculptures were delineated The experts came and studied the *Amaravati* sculptures Now, 130 years after they were embedded in the walls and were found deteriorating for the last at least 25 years, 120 of the sculptures that have deteriorated have been removed with the help of power tools (Drill and Chipper) within three months, without any damage They have been photo documented since some were broken even in the 19th Century AD, when they were fixed to the walls but the pieces were pasted together with lime mortar at the time of their original installation, as we found out

A Detailed View of the Work

An article titled ' Preserving heritage for posterity', the following partial reproduction is made This has been done to give a view point of a third person

"The drill saves the time needed to take the relics out Just imagine working with hammer and chisel A single piece would take a whole day With this drill we take out three to four pieces a day," shouted Dr Kannan for his message to surf the waves of staccato as the drill bit gored into the wall inch by quick inch Ghosh, Goutam (2002)

Holes were made in the wall round a piece at about four cm intervals, and sometimes wider A chisel bit was then used to cut into the wall In 20 minutes there was a uniform incision A cloud of choking red dust from drilled mortar and bricks hung in the air The work, thereafter, was hard

as the supervisor had to ensure that enthusiastic workers did not damage the relic. The stone relics were heavy and four or more persons were ready to grab each piece in case it reneged and popped out of the wall.

After cutting round a piece, one had to break into the brick-and-granite support behind it. With hardly any space to push the percussion drill in, the fingers suffered bruises once in a while. In a fraction of a second, the drill driver lost a patch of skin on his finger. It was seemingly a slow process as Arun, Sthapati, State Archaeology Department, switched between the drill and chisel bits to break into the wall.

Interestingly, the conventional method of using hammer and chisel had a much quicker impact in removing brick and granite remains from the obverse of the relic than the power drill with which the archaeology experts seemed to struggle at times. "But power drills are a must when we have to remove a relic from the wall," said Balasubramaniam, Curator, archaeology and the official in charge of the gallery.

The use of power tools technology in the museum was stated to be the first such direct use of the technology in conservation work in the country.

It is said that the Government Museum, Chennai has one of the highest number of this *stupa's* pieces in the world. The better pieces were carted away to the British Museum and the bits and pieces left behind for the Indians by the British regime then.

Of the pieces on display, 110 are within reach. Twenty-four have been removed so far, leaving gaping holes in the wall. "These pieces have been kept inside to be conserved later," said Lakshminarayanan, Assistant Director of the museum. (He died later on 16-8-2004).

The layout needs to be changed so that the displays are viewer-friendly without compromising on security. The commissioner and his team intend to display the relics more systematically to match the original *stupa*, whose model rests at one end of the gallery.

The pieces will be soaked in distilled water to dissolve the damaging salts. The salt absorbed from the wall has begun to ruin the relics. This decay must be stopped. The absorption has happened because of rising water levels during the monsoon, which is a result of faulty road laying policy — layer on top of layer. In the West, the old layers are scraped and then the new one laid so that the road level remains unchanged. Once the salt is flushed out by repeated soaking in distilled water the pieces will need to be treated to stop salt intrusion," said Mr. Balasubramaniam.

It was estimated that in a year (from 2002) or so, the displays in the *Amaravati* Gallery could match that of the professionally-managed museums across the world, but at a fraction of the expense for similar work in the West (Ghosh, Goutam, 2002)

Further Progress

A meeting was held by Hon'ble Minister for Culture, Government of India, Thiru Jagmohan, the Joint Secretary, Department of Culture, GOI, Dr C.T Mishra, the Director – General, National Museum, Dr R.D Choudhary and other senior officials were present on 13-1-2003, which was attended by me.

Using knowledge of use of power tools that this writer had gathered, 120 of the about 315 sculptures have been removed form the walls using Power Tools without the slightest damage. Many of them have already been conserved. This delicate operation is the first successful use of power tools on this scale for this type of conservation in India. *I personally started the use of the power tools by operating them myself with my two hands. After I had removed about five artefacts,* the Curator of Archaeology, Thiru R. Balasubramanian took over, initially under my personal supervision. Later on, he has picked up to be able to operate on his own. The cost is also only a little more than a lakh of rupees. This is the most economical operation of this type mounted so far. This explanation of the actual position has cleared a lot of misconceptions and may be avoided some unfavourable publicity and controversy.

After hearing all this and seeing the Museum's Journal (October 2001 – March 2002) wherein the work done in the Museum regarding the Amaravati artefacts has been documented, the Hon'ble Minister for Culture, Government of India appeared to have been impressed. He offered to come to Chennai in that month and have a look at the heritage building complex in the Government Museum, Chennai consisting of the National Art Gallery, Pantheon and Front Buildings including the Connemara Public Library old building where conservation was in progress by the ASI under a joint Central – State project.

The Hon'ble Union Minster for Culture, Thiru Jagmohan kept his word. He visited the museum in 2003. He found that I was using the tools personally, which surprised him. I informed him that I was the first person to dare to remove the artefacts embedded in the walls for 130 years, since everyone feared that they would be damaged. Also, no one knew how they had been embedded.

Hon'ble Thiru Jagmohan sanctioned a sum of Rs. 50 Lakhs being the largest single grant to a museum in India under the scheme for regional museums for renovating the *Amaravati* Gallery.

The State Government have formed a panel of experts as a Committee to oversee the renovation and give technical advice. The Committee has met several times in the period 2004 – 2006. In the last meeting held on 18-1-2007, it has been decided not to remove the small artefacts embedded at a height above 10 feet, in the interest of their safety and also because salinity does not rise to that level.

Photographs of the work of removal using power tools and the Moghul plastered walls as in 2003 can be seen in the colour plate-XLVI, page no 217.

The cavities in the walls have to filled up by stitching with the same type of bricks as was originally there. This was done in 2003 in the *Amaravati* Gallery. Re-plastering with traditional plaster called Moghul plaster, which uses egg white and has a shiny surface, which needs no white washing, was done. However, in 2004-05, it was white washed. May be where ignorance is bliss, it is folly to be wise.

A Technical Committee meeting for the reorganisation of the *Amaravati* Gallery was held on 10.10.2006 which was attended by me, Thiru R. Balasubramanian, Curator, Archaeology Section, Government Museum, Thiru K. T. Narasimhan, Superintending Archaeologist (Retd), Dr. V.N. Srinivasa Desikan, Asst. Director of Museums (Retd), Thiru M.G. Chellapillai, Retd. Tech. ASI, Chennai, Thiru Narayanan, Assistant Engineer, Department of Archaeology, Thiru K. Selvakumar, M.E., Assistant Engineer, (PWD) Buildings and Thiru Jeyaraman, B.E., Assistant Engineer (PWD) Electrical.

The following points were discussed and decision taken.

1. An architect should be identified for designing and reconstructing the *Amaravati* Gallery.

2. Architect may be selected by following the method adopted by the Archaeological Survey of India, for the Fort Museum, ASI. (For pre qualifications etc.)

3. AE (Civil), PWD to remove the remaining embedded and other sculptures under the supervision of the Curator Archaeology.

4. As soon as the artefacts are removed from the gallery the AE (Civil) should take up conditioning the entire area refilling the voids using suitable materials in accordance with archaeological principles.

5. The committee will meet next after the removal of all artefacts

6 Special Bricks of the same dimensions as suggested by Thiru K T Narasimhan may be procured to fill up the voids created in the walls, as done in 2003

7 The work of selecting the architect for designing the gallery will be taken up at the next meeting of the committee

8. All the small artefacts embedded on the wall may be left as it is, so as to leave the technology for posterity as to know how the artefacts were displayed in yesteryears and also for their safety

9. It is suggested that PWD Civil may be entrusted the works of removal of the artefacts with appropriate pre-qualification norms

At the meeting of the Committee held on 18-1-2007 attended among others by Thiru Satyamurthy, Superintending Archaeologist (Retd), ASI it was decided to entrust the work to the PWD as a deposit to be executed under the technical guidance of the committee.

It is hoped that there will be more progress in the near future

CHAPTER X

SEMINAR PAPER ON THE USE OF POWER TOOLS IN CONSERVATION (2001)

Introduction

Conservation involving repair of monuments has been done largely by the Archaeological Survey of India in this country. It was Lord Curzon, who started the movement for conservation in the last decade of the 19th Century AD. The many monuments conserved during his period like the Agra Fort, Akbar's Tomb and the Taj itself testify to the work done during the period. But the work was done by the Public works department engineers, since there was no trained cadre of conservationists and restorers. They adopted contemporary engineering techniques on the old monuments built with ancient engineering technique. In the *Tirumalai Naicker Mahal*, there are buttress walls on the sides of the tall ancient walls. Such walls were found on the sides of the *Kailasantha* temple at Kanchipuram, where now they have been removed by the ASI during conservation. Chisholm is the person, who is mentioned frequently in the 19th century and early 20th century period. Tie-rods are another favourite for preventing domes from collapsing as seen in *Tirumalai Naicker Mahal*. The use of this type of contemporary technique made the restoration look garish besides being mostly temporary lasting for a few years.

As thought developed, it was felt that historic techniques adapted to the contemporary time period should be used for historic buildings. This was incorporated in the PWD Works Code as early as 1953. Expertise for this purpose was developed in the ASI especially after Independence. Now there are many monuments restored by ASI. They have used traditional tools. In the light of the power tools now available, it would speed up work if judicious use were made of these instruments. Lack of proper training in the use of power tools is a crucial gap preventing their induction. Also, they have to be used selectively since the large mass of skilled and unskilled labour have to be provided productive employment. **This seminar is therefore well timed and has also to be backed up by field training of the actual users**. We shall see the exploratory efforts being taken in this direction in the Department of Archaeology and Museums, Government of Tamilnadu in this paper.

Use of Traditional Tools and Methods for Conservation

The traditional tools like hand chisel, hammers of various sizes, spades etc have been used by traditional masons and artisans called *Sthapathis* in South India. The exquisite carving and

stucco-work not found anywhere else in the world bear testimony to their high skill. This skill made the traditional tools weave magic in their hands. They were passed on from generation to generation, father to son and other students in the *Guru Parampara* (teacher – pupil tradition) of India.

However, in modern days, the skill level in these traditional tools is not as high as it used to be. Also the out turn of work is limited when traditional tools are used. This brings us to the use of modern power tools, which supply mechanically precision and also act as a force multiplier in work out turn. As a corollary, they result in cutting costs also. Therefore, when a large number of monuments are to be conserved their use where possible becomes highly desirable. In the Department of Archaeology and Museums, we have acquired a variety of these tools in the past one-year. We discuss below the power tools bought and the use we envisage for them.

Use of Tools in Grouting

Formerly the cracks found in ancient brick structure and core walls of stone monuments were grouted by removing entire structures in walls ceilings like bricks, tiles etc. This causes heavy expenses in removing, relaying the stone masonry walls. In ceilings also when cracks are grouted, the top surface will only be rectified with cement slurry and the bottom portion of the cracks will remain void. For rectifying the defects the pressure hand-grouting pump is very useful. By using this hand-grouting pump most cracks were grouted up to full depth in the ceiling and walls of *Tirumalai Naicker Mahal,* Madurai. We use mostly a Hand Grouting Pump. It is simple but efficient low cost equipment ideally suitable for grouting the cracks found in structures. The maximum working pressure is 3 kgs / cm^2. The grout is mixture of cement and water. The hand-grouting pump is used mostly in ancient bricks and stone structures for grouting the inner core portion without removing the affected portions.

Power Tools for Stone and Wood Working

Circular Saw, Planer, Angle Grinder, and Cutting Disc.

For replacing the decayed wooden joints, wooden beams etc, Circular Saw and Planer are now used. Previously the decayed wooden members have to be removed from the structures, bringing down to the work spot and then the actual size of wooden member have to be cut, planned and placed in original portion. Now all this type of work can be carried out at the required height since the weight of the machine is less.

Circular Saw

This machine is mostly used for changing the old wooden members in the ancient monuments We have bought Bosch Make machines Size of the blade is 7 1/4", load speed is 4800 RPM Since the weight of the machine is roughly about 4 kgs, it is easy for use in very tall monuments for cutting, removing, the old wooden joints etc and to replace the new one.

Planer

This machine is very useful to replace the old decayed wooden members in the ancient monuments for sawing the rough surface while introducing new members in the place of the old Load speed is 13000 RPM. The weight of the machine is 2 8kgs and it is very easy to operate at any height. The planing width is 82mm In the museum, it is used to plane new wood for making showcases etc.

Angle Grinder

Angle grinder is very useful to grind the iron members, frames etc. after welding and mostly used for fixing iron rods etc. to remove and to replace in ancient brick structures Grinding disc diameter of this machine is 1.80mm and number of load speed is 8500 RPM and weight is 4.9kgs.

Cutting Disc

Cutting Disc is useful for cutting the brick structures around the damaged sculptures and other objects in monuments for removing and replacing them Approximate cutting depth is 65mm This machine is useful for cutting brick masonry, lime blocks, bricks, tiles etc., which are mostly used in ancient structures. Speed of the machine is 6500 RPM We have used this to remove an Amaravati sculpture in the Government Museum, Chennai. We propose to use them also to remove the RCC joists, which have been wrongly used as replacement for wood in *Manora*, a tower monument in Tanjore

Rotary Drill Hammer

For removing any panel of sculptures from the wall for treatment normally chisels and hammer are used This system of chiselling will take much more time and consume labour For this purpose Rotary Drill Hammer is useful for drilling holes all around the panels without affecting the sculptures and is easy to remove from the wall Rotary Drill Hammer, cutting disc planer, Circular Saw, and Grinders are proposed to be used to remove *Amaravathi* Gallery limestone sculptures

from the wall without affecting the structures As seen above, we propose to use them also to remove the RCC joists, which have been wrongly used as replacement for wood in *Manora*, a tower monument in Tanjore

The Rotary Drill Hammer is mostly useful in monuments to remover the dislocated portions without affecting their nearby side structures Further this machine is very useful for removing the panels of the affected sculptures etc from the wall for further treatment. The initial chiselling is done slowly manually to know the size of the sculpture embedded in the wall and trace its outline Then drilling is done on the outer line leaving a small gap between the brick portion and the piece so that there is no possibility of the slightest damage tot he piece The weight of the Bosch make machine is about 4 kgs The size of the hammer core bits is 80mm For grouting the ceiling, walls etc in monuments this machine is used for drilling holes without affecting the structures and fixing PVC pipes for grouting with cement slurry

Drills

The normal power drill is used to drill holes in walls or wood removing the desired portion of the wall or wood alone This makes for precision instead of causing collateral damage as in the conventional process using manual tools The output is also many times that of the manual process causing great time, labour and cost saving We have such machines in both the Departments of Archaeology and Museums

Drawing Cabinet

Previously the drawings of ancient monuments were prepared and stored in PVC pipes and this method is not suitable since the drawings may get spoiled A drawing cabinet is useful for neatly stacking the drawings Only one manufacturer could be found in India when we tried to buy one

The Drawing Cabinets are very useful for storing plans, maps, art works etc of size A1 to A5 safely and systematically The cabinet consists of 6 drawers of width 1040mm, depth 780mm, and height 65mm The overall dimension of the cabinet is 1170mm, 865 mm and height 625mm Up to 450 drawings can be kept in a single drawer and can be stacked one over the other, placed side by side or back to back for conserving office space and to easy approach Drawing cabinets are very useful for ancient monument planes, elevation, sections, and plan of missing stones of stone structure monuments We also propose to scan the maps and store them in digital form This has to wait till computers are acquired and staff becomes as familiar with their use as in the Department of Museums

Automatic Levelling Instrument

Automatic levelling instrument is useful for taking contour levels in ancient sites before conducting Archaeological Excavations. This instrument is designed as friction- braked rotation for all-round easy movement. Levels can be taken even from a distance of 30 cm. The weight of the instrument is only 2 kgs. It is very useful for taking levels in hilly area where rock cut caves and rock beds are located. We have acquired an instrument this year.

Training of Staff

The usual problem in government is that holistic planning is not done. Usually, equipment is acquired but no one knows how to operate them. They lie around, deteriorate and then become unusable. Equipment manufacturers and sellers in this country do not arrange for orientation courses for the buyers along with the sale of the equipment. Marketing orientation is totally lacking. Recently, we had problems with a simple grouting machine till it was demonstrated by the seller how to use it. The result of this lack of user training is waste of equipment. The entire process of mechanisation gets a bad name. Even otherwise there is bound to be resistance to change among personnel who are used to certain methods for long years. This is called 'Normal Professionalism' in the language of Participatory Rural Appraisal. They will also not admit that they do not know the use of the new machines. A Participatory Approach will help as has been tried successfully in the Department of Archaeology and Museums. This seminar by familiarising and training the actual user personnel with this equipment has filled in a crucial gap in the use of power tools. More field demonstrations by actually working on monuments are needed before the use of these tools becomes widespread. More important their handlers will then alone become confident in their use and welcome them.

Conclusion

We have seen in this paper how traditional skill with simple manual tools has been used to create exquisite monuments and sculptures. The artisans are trained in their use for centuries with skills passed on from generations in the *Guru-Parampara*. While use of modern power tools ensures high out turn of work, mechanical precision and therefore lower cost, the personnel handling them have to be trained. The sellers do not train the users. This makes the equipment fail or lie unused giving a bad name to power tools in the process. There should also be a change to the philosophy from more labour intensity backed by simple tools to relatively high capital intensity with relatively higher cost equipment. Of course, this should be done only where appropriate since we have to provide jobs for our large population.

Acknowledgement

This paper is based on my field experience. I must also acknowledge on-the-job lectures given by Thiru K.T.Narasimhan, Superintending Archaeologist, ASI, Chennai Circle, who accompanied me to *Manora* and the Danish Fort at Tranquebar. He also explained the nature of the buildings of Connemara Library, the National Art Gallery and Pantheon Buildings of the Government Museum, Chennai. We also visited several temples together to learn on the job. I have been observing the work of restoration in all these places.

Post Script

Till the time of the seminar, the use of power tools in conservation was at a theoretical level. During the course of the seminar itself, the international delegates came to the Amaravati Gallery and I demonstrated the use of power tools by personally operating the Drill- cum- Chipper. They expressed great happiness.

CHAPTER XI

SAND-BLASTING

Monuments testify human efforts to the present day society through visible media. It is our duty to preserve them for posterity. During *Kumbhabishekams* (literally pouring sacred water on the copper vessels kept on top of the temple towers or *gopuras* – done once in twelve years normally), the general upkeep and maintenance of the temples is done. In the past during such *Kumbhabishekams*, white washing of granite pillars was done. Sand blasting as a method of removing the oil residue due to devotees wiping their hands after pouring oil into lamps etc was done to clean the granite surfaces. There is a wrong impression that the temple walls are built of solid granite. This is not so. Actually, *a cladding of granite is built on both sides which is packed with brickbats in the centre*. Therefore, when the thin granite-cladding tile (which looks like a granite stone wall) breaks, the entire wall will quickly collapse.

Sand blasting is very dangerous for the following reasons:

1. It removes the accretions along with the skin of the granite stone. This makes the stone crack quickly.

2. It creates cracks etc.

3. This will not remove the salt absorbed in the stones, but accelerates further salt absorption faster enabling further decay. This is due to removal of the skin.

4. This cannot selectively remove the accretions if the surface has paintings underneath the oily accretions.

5. This aggravates the damages that have already occurred to the stone surfaces.

6. Inscriptions are obliterated. This is an important source of historical record.

7. Sculptures especially bas-relief are either partially damaged or fully destroyed.

Therefore sandblasting as a method of cleaning the stone surface in temples *amounts to the worst from of vandalism*.

Due to intense pressure from the archaeologists and conservationists, Thiru M.A. Gowri Shankar, IAS, the then Special Commissioner of Hindu Religious Endowments Department completely

banned sandblasting in 2002. This was appreciated at a meeting held in the in the Government Museum Chennai by the Thiru K. T. Narasimhan, the then Superintending Archaeologist of the Archaeological Survey of India and Dr R. Kannan, IAS, the then Commissioner of Archaeology and Museums of the Government of Tamil Nadu and now come again for a second time. This was appreciated by the then Secretary Department of Culture, Government of India, Thiru N Gopalasamy, I.A.S. Soon after Mr. Gowri Shankar left the office, sandblasting has surfaced again. Many of the temples were sandblasted and stand as silent spectators with weathered and disfigured sculptures and cracked ceilings.

During our recent visit to Tiruvannamalai temple, we have been able to document visually some of the damage caused due to sandblasting. Peeling off of the skin of the granite stones in the base of the *Gopura* on the North Side was noticed.

Some of the pictures are shown in the colour plates

A proper method of cleaning with liquid ammonia was demonstrated by this department in 2002-2003 at the Parthasarathy Temple, Triplicane, Chennai, the temple at the bottom of the *Uccht Pillaiyar* Temple at Trichy and the Meenakshi Sundareswara Temple at Madurai. Sadly this has been given up. It is also amenable to mechanisation. A pump used to clean cars can be used for this method also. It is very cheap.

It is heartening to learn that the ban has been reimposed.

9-1-2007

Dr R Kannan , Ph D , I A S , and
Thiru R. Balasubramanian, Curator, Archaeology

Please refer the colour plates - page nos. 219 and 221, pertaining to this Chapter

CHAPTER XII

PORTO NOVO – Development for Heritage Tourism

Introduction

History

Porto Novo, known also as *Parangipettai* (also called Faringipett Muhammad Bunder), is a small town of historical importance. The town is situated at 11° 31 North Latitude and 79° 51 East Longitude. It is 8 miles north east of *Chidambaram*, 115 miles miles south of Chennai (Madras), 20 miles (*Cuddalore –Pondicherry* 24 KMs) south of *Cuddalore*, and 32 miles south of *Pondicherry*. This town is also called as Muhammud Bunder. The name *Porto Novo* given by the Portuguese means 'New Harbour ' Muslims called this place as Muhammad Bunder, which means 'An excellent Port.' The town is now called as *Parangipettai*, which means 'European settlement'.

In 1780 Hyder Ali plundered the town, and July of the following year was fought in its vicinity the famous battle between Sir Eyre Coote and Hyder which has taken its name from the town. The French landed a large force here in 1782 and marched thence with *Tippu* and captured *Cuddalore*. It had population of 7,182 persons in 1871 and has considerable trade with Ceylon and Acheen. The location of Acheen is not mentioned in the Manual. (Manual of the South Arcot District, Compiled By J.H. Garstin M.C.S., Collector of South Arcot, Madras, printed at the Lawrence Asylum Press, By W.H Moore, 1878, P.430-431). It is one of the four kingdoms into which Sumatra was divided in the 17th Century.

Topography

Parangipettai is located on the Coromandal Coast at the mouth of the River *Vellar*. This town connects with inland water ways which helped in the promotion of trade and commerce and industry in the 19th Century AD, when it was an important port. The River *Vellar* has steep banks and receives the water of the smaller river, *Manimuktanadi* near *Vridhachalam*. Tides penetrate inland for about seven or eight miles from its mouth. It runs into the sea at *Porto Novo*. Its course near that town was straightened by the Department of Public Works in 1848 AD.

First Steel Company in India

Heavy iron ores were transported from the Salem region in the river *Cauvery*, *Kollidam*, *Veeranam* and Khan Sahib Canal. This kind of geographical location was very favourable for setting

up the Steel Company here The steel manufactured bere found its way to the Indian Railways and to the bridges in London Coke made from forest wood was used in the furnace, but Lignite of *Neyveli* was not known earlier *Porto Novo* might have been the oldest Steel Company in the country It was started in 1830 In 1830 Mr Heath erected works at *Porto Novo* and made such experiments (Manual of South Arcot District, page No 442) AD and functioned till 1883 AD

Importance to the Environment

The environment in *Parangipettai* is suitable for study of Marine organisms Many scholars studies about the rare species, Hence the Annamalai University inaugurated a Centre for Marine Biology here in 1963.

Historical Importance

The history of *Porto Novo* began with a *Nayaka* king *Ragunatha Nayak* (1597-1640), who built a new town called '*Krishnapatnam*' with a fort near *Porto Novo* on the Banks of *Vellar* the site of which still is pointed out as '*Kottaiyar*' He permitted the Portuguese to build a Church

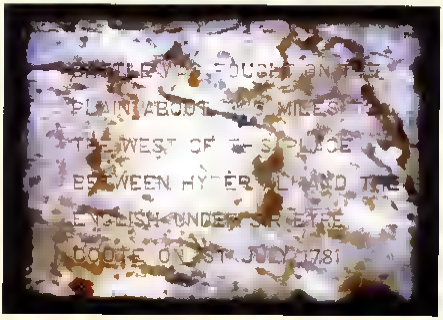
J H Garstin Madras Civil Service, the then Collector of South Arcot, the compiler of the Manual of the South Arcot District 1878, in his preface narrates " I do not think that it (gazette) could have been more condensed with justice to the subject, for there is hardly a District in all India that is, historically, more interesting to an Englishman than South Arcot " In the power struggle between the English and French and their allies, many battles were fought in *Porto Novo* and its surroundings Being a harbour *Porto Novo*, acted as a naval base

First Settlement

Portugese

The first European settlers on the Coromandal Coast with in limits of the *Gingee* country (*Gingee Nayakdom*) were the Portuguese who founded a settlement at the mouth of the *Vellar* river and called it *Porto Novo* The date of the settlement it has not been found practicable to determine positively, but it was probably during the later part of the 16th century AD May be more than 30 years after the establishment of an English factory at Madras in 1639 AD Settlement seems to have been effected there there during 17th century, probably during the Viceroyalty of Albuquerque An English settlement was made there in 1683 In 1742, the factory being in a ruinous condition, a good house was purchased for 500 *pagodas* and resident was appointed

Porto Novo



Porto Novo Marble Plaque commemorating Battle of *Porto Novo* 1781

Porto Novo Mast of old ship in poor condition 26-10-2006

Sir Eyre Coote (1726-1783 AD)

It is an oil painting painted by Thomas Hickey a British artist worked in India during 19th century. During his stay in Madras from 1812 to 1824, he was employed for conserving the portraits of Governors and Generals. The portrait of Sir Eyre Coote had been copied on to a canvas by him. Sir Eyre Coote had served as the Commander-In-Chief of the army from 1769 to 1770 and 1778 to 1783. (Portrait in the Collections of the Government Museum, Chennai)

The Portugese were followed by the Dutch who obtained a cowle from the *Bijapur* Governor of *Gingee* (Senji) in 1613, quitted the place in 1678, returned in 1680 and thenceforth maintained an establishment of greater or less importance until 1825. The *Porto Novo* (*Parangipettai*) *pagodas* which they coined were well known. The ground on which they washed and dried their fabrics for export is still called *Vannarpalayam* (Washermen's hamlet and, in their old cemetery called Ollander Thottam (Hollander's garden) by the people, he buried in two massive tombs ornamented with elaborate armorial bearings of some individuals of their nation in 1730 and 1737. In 1745 the Dutch transferred to *Porto Novo* (*Parangipettai*) their factories at *Cuddalore* (*Gudalur*) and Fort St. David and thenceforth the town became their only important establishment in the district.

Maratha Plunders *Porto Novo*

In 1677, Sivaji captured South Arcot and also appointed havildars for *Porto Novo* division. In 1747, the Marattas plundered *Porto Novo* and a considerable body of them appeared close outside the Cuddalore Bounds.

Dutch Shift to *Porto Novo*

The Dutch had quit *Cuddalore* and *Devanampatnam* for *Porto Novo* in 1745. When all the buildings of *Devanampatnam* were being destroyed, permission was requested from the Dutch Governor at *Nagapatnam* to demolish the factory.

In 1781, war having broken out between the English and the Dutch, the former seized the Dutch factories all along the coast including *Porto Novo* (*Parangipettai*). In 1785, the place was restored. In 1795, it was again taken and was restored only in 1818. Finally in 1821 it was handed over to the English along with the other Dutch possessions in India.

Danes

The Danes also had a factory at *Porto Novo* (*Parangipettai*) which stood on the river bank on a site granted by the Nawab of Arcot on payment of a nazzar of 81 *pagodas*.

Power Struggle between English, French and Dutch

English

The English opened a factory therefore the first time in 1683, but in 1688 removed it to *Kunjimedu*. Later on a minor agency was reopened and continued to exist till the middle of the

eighteenth century A.D. In 1760 Eyre Coote drove the French out of the place after his victory over them at Wandiwash. *Hyder Ali* in his raid of 1780 devastated it, in 1781 was fought the decisive battle of *Porto Novo* (*Parangipettai*). Hearing that Eyre Coote was at the place landing some battle cannon sent from *Cuddalore* (Gudalour), Hyder marched up from south covering 70 miles in two days and on the night of 27th May, 1781 reached *Motapalayam*, four miles west of *Porto Novo* (*Parangipettai*). Here was fought, four days later, the battle from which *Hyder Ali* was forced to retreat. In 1782, the French marched on *Cuddalore* (*Gudalur*). In 1785, the town was restored to English by the treaty of Versailles.

The following is taken from the Manual of South Arcot (Compiled By J.H. Garstin M.C.S., Collector of South Arcot, Madras, printed at the Lawrence Asylum Press, By W.H.Moore, 1878, P.430-431).

20th March 1673-4, "Having receiving an invitation from the Cawn Gingee Nasi Muhamad Khan by the letter and by his Egyb Ismael, alias Manoel d' Olivera, to set up factories and built forts at or near *Porto Novo* and at *Vardhavur* (*Valudhavur*) near *Policherry* (*Pondichery*), resolve to send a civil answer and present by one company's servants with instructions receive such terms as the Cawn may think fit to grant and to survey and report on the places and rivers. The Cawn request that, if the place are approved, an Englishman or to or two and a half score of peons may be sent to take possessions and to set up the English flag and to hold it, freeing him from the importunities of the French and Dutch".

The first attack is thus recorded in the Madras records. - "Sunday, 20th February 1698. – General letter from Fort St. David (*Cuddalore*) received this day giving an account that Selim Khan sent a letter to the President of the Fort St. David, desiring that nine ox loads of the King's Treasure passing to camp might to the remain one night in *Cuddalore* for security, which being brought by some horsemen on the 17th in the afternoon said horsemen next morning seized *Porto Novo* gate wounding Corporal and another party".

In 1697 was peace proclaimed between England and Holland and France in consequence of Treaty of Ryswick. In 1699, *Pondicherry* was restored to the French by the Dutch, who, however, before they would give it up insisted on being paid 16,000 *Pagodas* as the value of the improvements of the fortifications.

Porto Novo and Anglo- Mysore wars

The Army marched on *Porto Novo* on the 22nd January 1781. On the 24th Sir Edward

Hughes arrived with the battering train. While rafts were preparing to carry it to the River Coleroon, the Mysorean army appeared in sight of *Porto Novo*. Hyder was preparing to besiege *Trichnopoly* when the commandant of *Chidambaram* send him word of his having beaten off the English and of their having retreated to *Porto Novo*. He marched 70 miles in two days, and on the night of the 27th May, 1781 reached *Motapolliam*, 4 miles West of *Porto Novo*. Finally in the year 1781, Sir EyreCoote followed Hyder and made unsuccessful attack at *Chidambaram*. He returned to Porto Novo, where he fought a crucial battle with Hyder Ali, defeated him and forced him to withdraw from the Carnatic.

This war had given a very bad experience to the British. The Manual states 'The battle of Porto Novo was one of the most critical that was ever fought in India. Had the English Army been broken and obliged to retreat it would probably have been entirely destroyed by the multitude of Cavalry by which it was surrounded, and the whole Carnatic would have been at Hyder's mercy".

Parangipettai Copper plates

Two copper plate records are related with *Parangipettai*. These two records are issued on the same date Saka 1697 (1747 A.D.). The first record was 'Ulandha Kumpany (Holland Company) Copper plate.' The other record was issued by the Natives and Traders of *Porto Novo*. Both records were issued for the purpose of renovation of the Thousand Pillared hall, Four *Gopurams* and *Panchatchara* Wall of *Chidambaram Nataraja* Temple. Now the two plates are in the possession of the *'Kasi Madam, Thirupanandal*, Tamil Nadu. (*Thirupanandal Kasi Madathu Cheppedugal, Pulavar Se. Rasu. Kongu Aivu Maiyam. Erode*-11, 1999, Page 38 to 42).

Copper plate No. 1:

This plate was issued by the Holland company traders. Rectangular in shape, and the image of Lord *Nataraja*, *Sivakami* and *Pathanjali Rishi* are engraved near the handle. It contains 31 lines of inscription in Tamil. Gives brief account of export of sarees - one *Varahan* (*pagoda*) levied for each bundle and the same given to the *Nataraja* temple. It is mentioned that, this will continue till the existence of the Company.

Copper Plate No 2 :

This copper plate gives a detailed list of goods exported from *Porto Novo*, and a certain percentage of the tax levied and amount collected was used for the improvement works in *Chidambaram* Temple.

Porto Novo Mint

Arcot Nawab Walajah struck his coins besides Arcot at *Porto Novo* and *Trichinopoly* The accounts of Hijri 1198 - 1783 A D show the annual coinage at the *Porto Novo* mint was 3, 00,000 Pagodas On which profit to the state (Sircar), including mint charges fees (*rusums*) at the rate of 10 ½ *Feringpet Pagodas* per thousand, was 3150 pagodas. (The International Numismata Orientalia, Coins of Southern India, Sir Walter Elliot, Cosmo Publication, Delhi-110006, 1975, page 144.)

One more evidence available for the existence of a mint here is copper plate No 2 written by 'Kumarasamy s/o Pethu Pattar of the mint (*Thangasalai Pethu Pattar kumaran Kumarasamy Eludhina Pattayam*)

Local Manufactures

The local manufacture of *Porto Novo* is a species of mat, made from the leaves of wild pine-apple, in limitation of similar mats of an exceedingly soft and elegant make imported from Acheen (Manual of the South Arcot District, Compiled By J H Garstin M C S., Collector of South Arcot, Madaras, printed at the Lawrence Asylum Press, By W H Moore, 1878, P 430-431)

Canals

To facilitate the carriage of the iron ores from Salem, the old Khansahib's Canal was made navigable in 1854 by the construction of three locks, one where it leaves *Veeranam* tank and one a little lower down

The excavation of East Coast Canal at *Porto Novo* was commenced in 1853 and considerable progress was made in 1857, when the mutiny seems to have put a stop to it in common with many other Public Works A small expenditure would probably render the Canal navigable for boats *Vellar* to Paravanar and so to *Cuddalore*, but the construction of Railway seems to render such expenditure hardly necessary (Manual of the South Arcot District, Compiled By J H Garstin M C S., Collector of South Arcot, Madaras, printed at the Lawrence Asylum Press, By W H Moore, 1878, P 430-431)

The First Iron works in India

From 1824 and for many years afterwards, efforts had been made to establish iron works at *Porto Novo* and a company established a large factory there, but after many years of patience and endeavor the enterprise had to be abandoned

In 1824, Mr J M Heath of the Madras Civil Service addressed the Madras Government asking for certain privileges to be conferred on him to enable him to carry out a scheme to which much of his attention had been directed for some years past, namely, the manufacture of bar-iron in India. He stated that the samples sent to England by him had been declared equal to the best foreign iron for making into steel, and in order to enable him to embark on the undertaking on a large scale he asked first for a grant of the exclusive right of erecting works for making iron in India for the remaining term of the Company's Charter and second, for a lease of the right of cutting fuel on Sirkar (Government) waste land and raising ore at such mines as he should erect works at with in the same period

Sir Thomas Munro, then the Governor, and the Members of Council all minuted in favour of granting Mr Heath's requests and recommended his case for the favourable consideration of the Court of Directors

The Supreme Government, however, hesitated to join in the recommendations made by the Madras Government and the Court of Directors, in 1826, declined to confer on Heath the exclusive privilege which he solicited, but authorised the Madras Government to confer on him, in the event of his prosecuting the undertaking without any exclusive privilege, a lease of the right of cutting fuel from Sirkar waste land and of raising ore at those mines where he might erect works, for the remainder of the currency of Company's charter of 1813 i e till 1833

In 1825, Mr Heath, having received promise of pecuniary support from Messrs Alexander and Co of Calcutta, resigned from the Civil Service and went to England to get information and machinery Towards the end of 1829, on the eve of departing again for India, with all materials for commencing of establishing iron works in the country, he requested the Court of directors to reconsider his former proposals, and the result was that the Court granted him the exclusive privilege of manufacturing iron on the European plan as mentioned in the Manual of South Arcot during the remainder of their then current Charter in the territories of the Madras Presidency alone

He returned to India in 1830 and by the end of that year had erected works at Porto Novo, and made such experiments as he thought sufficient to warrant the expectation of perfect success in making iron in the Indian climate By this time his own funds were exhausted On applying to Messrs Alexander and Co , for assistance, he found that it was not convenient for them to make him any advances, owing to the great commercial depression prevalent at that time He then applied to the Madras Government for loan from the Bank on the security of his works, and this was granted him to the extent of Rs 76000 But some difficulties appeared to stand in the way of making direct

loan from Government. Threfore, the then Governor, Mr. S. Lushington, gave Mr. Heath a contract for supplying Government with cotton for three years, in the hope that the profits of the contract would enable him to carry out his iron works. The speculation, however, failed, the cotton was rejected and the contract was put an end to, leaving Mr. Heath indebted to Government, on this account alone, to the amount of Rs. 1,35,000.

In the meantime, the Company's Charter had expired, and with it the privileges granted to Mr. Heath, before he was able to drive any advantage from them. His earnest entreaties to Government for further support, however, induced the Governor Sir Fredrick Adam, to appoint a committee consisting of Mr. J. Dent and Lieut. Colonels Cullen and Wallpole, to investigate Mr. Heath's claim and to report on the propriety of conferring upon him additional privileges and assistance. The Committee visited the Porto Novo works and after examining minutely the whole of Mr. Heath's plans, and seeing the process of manufacture carried out, reported very favourably on the project estimating the profits of the concern, on a very moderate calculation, at £ 30,000 per annum if the undertaking should succeed. To do so, however it was necessary, according to Mr. Heath's computation, that 4,000 tons of pig iron should be made annually. This he calculated, he could make at 6 guineas a ton and could sell in England at from £ 12 to £14 a ton, and a quality equal to the best Swedish iron which then fetched £ 40 a ton. On this the Government determined to advance Mr. Heath the sum of Rs. 3,60,000 as the only chance of recovering the sum already due by him, (namely Rs. 2,11,000), and of enabling him to prosecute his plans, thus raising Mr. Heath's debt to Government to Rs. 5,71,000. The loan was appropriated as follows :- Rs. 1 Lakh was to be paid to the trustees of Messers. Alexander and Co., in satisfaction of their claims of Rs. 2,50,000 on the Porto Novo property, another lakh was to be paid into the hands of trustees to pay off Mr. Heath's debts, and the remaining 1,60,000 Rupees was to be laid out in carrying on the manufacture.

The securities for these advances were Mr. Heath's personal bonds, and as collateral security, the mortgage of the whole *Porto Novo* property including a sum of Rs. 3,60,000 to be advanced by certain persons in Madras who had taken shares in the business and had formed themselves into the *Porto Novo* Steel and Iron Company. It was also stipulated in Mr. Heath's indenture that 1/3 of the profits of the business should be set aside for the repayment of the money lent to him.

Mr. Heath's exclusive privilege of raising and cutting fuel having expired with the East India Company's Charter in 1830 as already stated he asked that he should instead of renewal such exclusive privileges, have authority granted him by the Government to rent from them the right of

raising minerals within certain specified limits, and of cutting fuel from certain woodlands for a term of years, such rights to extent over Government waste lands, and over the Zemindari and other lands if proprietors gave their consent and came to terms with him, that for the five years the mineral and fuel rights over Government should be free, and after that period that a royalty should be paid on the produce of the works either in its raw or worked-up state

The Government accordingly authorised Collectors of Districts to receive from Mr Heath application for leases of the right of raising ores and cutting fuel on the favourable terms, provided they were not inconsistent with the customs and usages of the country and did not interfere with the rights and privileges of the natives The leases were to be submitted through the Board of Revenue for the sanction of Government Mr Heath accordingly sent applications for leases to cut fuel in South Arcot, *Thanjavur*, *Trichnopoly*, and to raise ores in *South Arcot*, *Salem*, *Coimbatore*, *Malabar* and *Canara* and Chrome ores in *Salem*

In the leases, as finally granted by Government in 1834, the royalties were fixed on chrome ores and on pig iron

	Iron	Chrome ore
For the first 5 years	Free	Free
For the second 5 years	1 Rupee a ton	Rs¼ Per candy
For The Third 5 years	1½ „	„ ½ „
For the last six years	2 „	„ ¾ „
If the lease was renewed , annually	3 „	„ 1 „

In South Arcot all the rights were restricted to the Taluks of Chidambaram, Vridhachellam, Ellavanasur, Bowmgiri (present Bhuvanagin) and Cuddalore. The lease in the case of fuel as in that of the mineral leases was for 21 years, and for the first five years free, for the second five years on payment of an annual rental of Rs 500, for the third 5 years of 1,500, and of Rs 2,000 a year if the leases were renewed

The Court of Directors, in their dispatch of 11th February 1835, expressed their strong disapproval of the of the action of the Madras Government in advancing Mr Heath money and strictly forbade any more being lent him

By the terms of his bonds Mr Heath bound himself to pay Government yearly interest at 4 percent on the money lent to him, and to repay the principal with the interest for the proceeding

year on the 1st September 1839, five years from the date of the loan, but in September 1837 the members of the *Porto Novo* Steel and Iron Company resident in Madras again applied to Government (in a letter signed by Messers Heat, G Norton, Ranninster and Moor Lane and dated 20th September 1837 for further concessions and assistance asked (1) for the remission ? (This portion is damaged in the manual), permission of the first 5 years interest on the debt due by Mr. Heath, for the repayment of which their whole stock property and produce were mortgaged to the Government; (2) that all interest might be further remitted until the works began to pay, (3) for remission of the payment of the rent and royalties for the next 5 years, (4) for an extension of the existing leases; and (5) for the continuation of the exemption of ores and iron from import and export duties for 5 years more.

On this the Government appointed a second committee consisting of Mr Garrow, Mr Dent and Captain A.T ? (damaged in the Manual) to examine the accounts of the Company and to report whether the condition of the works was such as to afford a fair probability of success if the indulgence solicited were partially or entirely conceded. The committee proceeded to *Porto Novo*, and after examining into the accounts and the condition of the Company recommended to Government.

1st – That every kind of demand upon the Company in money should be given up for the present, that they should be allowed to cut fuel, to export their iron and the mine and to convey their ore, without any charge whatever for the period of 5 years

2nd - That the interest on the sums borrowed from Government should be remitted from the dated of the loan till the works were really in a prosperous state

3rd – That the leases should be extended for a further term of five years

4th That everything in the power of Government should be done to aid the works and to prevent an entire stoppage of the undertaking, which would in every way cause so series a loss to Government An extensive order for castings, or a monthly advance of cash, just sufficient to enable the company to keep two furnaces in blast, would, the Committee thought secure the undertaking for the present.

The Government sent a copy of the report home to the Court of Directors and asked for orders, pointing out the greater part of the large sum due by the company (Rs. 5,71,000 exclusive of interest) would be entirely stopped They shortly after sanctioned advance £ 6 a ton on 50 tons of iron castings for six months, in order to keep the furnaces employed

The Court of Directors sanctioned the proceedings of Madras Government in conceding the delay requested the Iron Company in the matter of the re-payment of the loan as the entire loan of the works and the total loss of the large advances made to Mr. Heath must have been ensured on the enfacement of the claim to punctual Payment and consented to an extension of the leases (which were granted originally for 21 years) for 5 years more, and also to the relinquishment of the demand for interest for 5 years, but not indefinitely. They also granted the exemptions from payment of rent on lands, and any royalties on ore or mines, for a second period of 5 years, and the remission of all import and export duties for a similar period.

In spite, however, of all these concessions on the part of Government, and the continuance of and the Company the works did not pay and no part of Mr. Heath, or the Iron Company's debt was liquidated up to 1844. In that year, the court of Directors agreed to suspend the enforcement of their claim on the Iron Company for 5 years

On the formation of the Company, operations were resumed with vigour under the Mr James Berument. Fresh works were erected at *Trinomalai* (*Tiruvannamalai*) in South Arcot, and in Salem, large quantities of pig iron excellent quality were sent to England. In1863 an extraordinary meeting of the share holders of the company was held. Wheels, axles, ingots and rails were manufactured. Under the terms of company's lease, the buildings at these places but not the machinery will pass in to the possession of Government on the 1st January 1883.

Heath spent all his resources on the experiments and other basic works to start the iron plant. Further, he needed still more investment to proceed in his enterprise. His efforts were aborted by the prevalent economic depression and the Government's denial of funds. He struggled to resurrect himself from the pecuniary deluge by disposing his properties (From the book - Salem City an Ethno-history (1792-1992), K. Lakshminarayanan, T. Gangadharan, N. Chandrasekar, Publisher Vysya College, Salem, Tamil Nadu, First Edition 1999, Page No 8. It is mentioned as Tranquebar instead of *Porto Novo*).

I was assisted in preparing this history by Thiru N. Sundararajan, Education Officer, Government Museum, Chennai.

Dr R Kannan, Ph.D., I.A.S.,
Special Commissioner and
Commissioner of Museums,
Government Museum, Chennai-600 008

Date: 27-11-2006

ARCHAEOLOGICAL PRESCRIPTION FOR PORTO NOVO

27-10-2006

I inspected *Porto Novo* Site along with the Sub Collector, *Chidamabram*, Thiru Arun Raj I A S., and the Curator of the *Cuddalore*, Government Museum, Thiru Kalathi, Thiru Ramesh, Photographer etc ,

There is no evidence on ground of any fortification – only excavations will reveal if there are any; there is a marble stone plaque commemorating the battle between Sir Eyre Coote and *Hyder Ali* that took place about 2 miles West of *Porto Novo* on 1st July, 1781 This may be carefully preserved using Wacker chemicals of Germany.

There is a flag mast of Steel (riveted) with two old long pieces of wood on one on top of the mast and the other hanging loosely near the top of the mast The height of the steel pipe could be 50'feet. The length of the wooden piece on top would be about 17 feet and of the wooden piece hanging loosely on the side about 15 feet This is only an eye estimate

There are Cairn stones around the base with holes near the top of the stones to tie the Stay wires of the mast At present the wires are directly anchored on the ground The old system may be restored of tying to the Cairn stones may be restored after suitably strengthening the anchoring of the stones in the ground.

The steel is not rusted and is firmly sunk into the cement platform-, which has a small, raised saluting base. There is no need to disturb the platform, but the plant growing on the small raised platform may be removed and the plastering may be redone.

If a park has to be put up it may be in the shape of a Ship/Man-O-War that the mast was part of originally, with the nose of the wall of the park facing the Vellar estuary Cannons of the 18th Century as suggested by the Sub-Collector may be fixed on the sides of the 'Walls of the Ship' A Captain's Cabin (wheel house) can be created with a 'period marines compass'- etc to make it a theme park. The platform aft portion can have a rudder shaped wood The colour of the wall of the ship of the period should be that of mango wood (*Aini*) wood (*Artocarpus hirsutus Lamk*., trade name – *Aini* (*Moraceae*). Distributed in W Ghats. *Aini* is wood of excellent quality, used for piles in bridge construction, carriage building, furniture, tool handles, crates, packing-cases, boat-building and turnery) / Oak of which English ships of the period were constructed. Suitable monument lighting arrangement as I have done at Government Museum, Chennai and *Dansborg*,

Tranquebar can be done. *I enclose the photos of a ship of the period which can be used as a model for the theme park.*

As the Sub Collector suggests period lantems with electric bulbs can be hung to conform to the theme of the Ship. Seats can be provided with the same look with an ornamented PVC wood look alike which are now available to give an 18th/19th Century look.

Mast

The mast has segments of as per eye estimate since it was raining heavily (5 x 10 feet + 2 x 5 feet + wood) riveted on sides – Segments have been screwed / the last segment is driven into the ground. A steel ladder has been placed from the 4th segment to the 6th segment just below the top segment. The Sub - Collector confirmed after personal verification that there were no inscriptions on the pipes, which make up the mast.

Wood Preservation

The wood is to be cleaned by Acetone and the Crack which is found to be arrested by the Fine Saw Dust (Teak Wood) and Fine Saw Dust should be mixed with polyvinyl Acetone (Fevicol) and the wood has to be coated by chemicals (MRF superior exterior coat called poly urethane).

Preservation of Steel

The Steel Pillar is to be cleaned by Acetone and then cleaned by pumice powder with kerosene and rubbed by cotton waste and it is to be preserved by Du Pont chemical coating.

A Flag can be flown after conservation if deemed fit.

The historical note on *Porto Novo* prepared by me and attached to these notes of inspection may be placed as an enamelled board on the Archaeological Survey of India pattern for the information of tourists and visitors, with due acknowledgment to the authors.

I enclose four photos of ships of the period as well as masts, which can serve as a guide during restoration and also for display at the site of the proposed Theme Park for the benefit of tourists.

Dr.R.Kannan, Ph.D., I.A.S.,
Special Commissioner and
Commissioner of Museums,
Government Museum, Chennai-600 008.

SIR EYRE COOTE (1726-1783 AD)

It is an oil painting painted by Thomas Hickey, a British artist worked in India during 19th century. During his stay in Madras from 1812 to 1824, he was employed for conserving the portraits of Governors and Generals The portrait of Sir Eyre Coote had been copied on to a canvas by him Sir Eyre Coote had served as the Commander-in-Chief of the army from 1769 to 1770 and 1778 to 1783 (Portrait in the Collections of the Government Museum, Chennai)

CHAPTER XIII

CONCLUSION

In this book, we have dealt with the general principles of conservation and their application The history and interesting information on each of the monuments, temples and structures etc have been given, which are of interest to the scholar and lay reader These have been gleaned from privileged documents like the Accession Register maintained by the State Department of Archaeology and other sources like the records and publications of the Government Museum, Chennai and by hard field work, trekking miles in jungle and remote areas The theory of conservation i e the techniques of conservation has been distilled from the practical examples cited here The practical application of these techniques with numerous examples citing national and international experiences should help to avoid the usual mistakes made in conservation by the new initiate The subject is demystified by making public the Archaeological Prescriptions for the monuments and temples conserved and restored This covers those protected by the State Department of Archaeology and those under the control of others. The history and methods of construction of the heritage buildings housing the Government Museum have been given separately to distinguish them from those of the State Department of Archaeology The methods adopted to conserve and restore the Heritage Buildings in the Government Museum, Chennai are also related. This deals with Indo- Saracenic British buildings with features of temple architecture *International experience of Hindu temples and monuments Indian origin in Cambodia and Vietnam have been narrated for comparison* Detailed estimates for conservation of the *Devāsraya Mandapa* at *Tiruvarur*, which are seldom shared, have been given in this book This was part of Outreach Activity This is as stated earlier, like the great *Ramanujacharya* shouting out from the *Tirukoshtiyur* Temple tower the mantra imparted to him for his personal salvation, so that everyone could benefit This writer has given it for the benefit of future generations of historians and archaeologists

There is a modern Western jargon for what the great *Ramanujacharya* did It is called the methodology of the Participatory Approach (Participatory Rural Appraisal – in jargon) In all his work, this writer uses this approach Sharing what is learnt is the characteristic of the PRA Approach as contrasted with hoarding of information or physical goods in the Normal Approach Yours truly uses this approach in all phases of his work This approach is explained elsewhere in the book on PRA written in 2001 The writer has shared what was learnt, so that the wheel need not be reinvented This will be helpful in the future when the same monuments or similar monuments are taken up for conservation, may be in the near future or even a century later

The conservation of the priceless sculptures of the *Amaravati* gallery is an important issue This is an interconnected topic with the main issue of conservation of monuments The use of power tools, a pioneering effort for India for this purpose should show that there is no blind bias towards ancient methods only Sandblasting destroys our ancient temples without any doubt. The problems due to this and alternative methods to sandblasting have been dealt with Notes of inspection with a background note on the history of the monuments at *Porto Novo* as Outreach Activity show how the department helps in tourism development without abandoning heritage conservation principles As seeing is believing, a lot of visual material in the form of plans and photographs of the state of the monuments before conservation and restoration, visual presentation of the methods adopted during various stages of conservation and the final result as the 'After' are presented These 'Before-After' photographs are the key to instil belief in an incredulous audience, since many false claims are made these days

Timely intervention has certainly saved certain monuments like the *Manora* Tower or the Danish Fort at *Tranquebar* or the *Vittala* and *Jain* temples for posterity Where intervention has not occurred as in the case of the *Masilamaninatha* temple on the sea shore at *Tranquebar*, the results have been sad They have been lost

When this writer started on the lonely and uncharted road of conservation, there was a lot of apprehension Doomsday predictions were many In India, the role of Government is a risk averter than a risk taker The latter is probably the role of the entrepreneur Therefore, there is an outcry raised for a scalp, when a problem occurs during conservation. A wag stated that "no good work in government shall go unpunished" I do not agree, but yet there is need to ensure that no undue risk is taken These are old monuments There is a need to be familiar with the ancient texts on *Vastu* and architecture like *Mayamata*, *Manasara* etc or at least refer to them Learning from an experienced archaeologist like Thiru K T Narasimhan helps Hand holding is possible up to a point only But the final leap to independently undertaking conservation has to be performed by the individual archaeologist He or she is alone It is lonely at the top of a monument.

The *Bhagavad Gita* states that only work is thy concern, not the reward – a wag stated that may be in the Oriental society to which we belong the reward is taken by the God himself But the *Gita* also says that there shall be no attachment to inaction In that spirit, this writer has worked The Latin maxim states ' *Labour omnia vincit* '

If some part of our precious ancient heritage which is without peer in this world, ours being the only culture from the hoary past alive till now, is preserved for posterity, due to the contribution that this writer might have made like that of the squirrels in the *Ramayana*, this birth has taken the soul to a slightly higher plane.

Datta, Dayadhvam, Damyata,
Shantih, shantih, shantih

(Give, sympathise i-e. be compassionate, control, peace with oneself, fellowmen and world according to *Hinduism*, peace of speech, mind and body according to *Buddhism*)

(From T. S. Eliot in Wasteland quoted from *Brihandaranyaka Upanishad*, Chapter - V, *Brahmana* - II.)

BIBLIOGRAPHY

1. Acharya, Prasanna Kumar (1979) *An Encyclopaedia of Hindu Architecture,* Manasara Series Vol VII Oriental Reprint 1979, Oriental Books Reprint Corporation, 54, Rani Jhansi Road, New Delhi-110 055

2. Acharya, Prasanna Kumar (1979) *Hindu Architecture in India and Abroad,* Manasara Series. Vol VI, Oriental Reprint 1979, Oriental Books Reprint Corporation, 54, Rani Jhansi Road, New Delhi-110 055

3. Acharya, Prasanna Kumar (1979) *MANASARA on Architecture and Sculpture*, Sanskrit text with critical notes by Prasanna Kumar Acharya, Manasara Series Vol III, Second edition 1979, Oriental Books Reprint Corporation, 54, Rani Jhansi Road, New Delhi 110 055.

4 Acharya, Prasanna Kumar (1981) *A Dictionary of Hindu Architecture,* Treating of Sanskrit Architectural terms with illustrative quotations from *Silpasastras*, General Literature and Archaeological Records, Manasara Series I. Vol I, Second edition, Oriental Books Reprint Corporation, 54, Rani Jhansi Road, New Delhi 110 055

5. Acharya, Prasanna Kumar (1981) *INDIAN ARCHITECTURE, According to Manasara-Silpasastra* Manasara Series Vol II, Second edition 1981, Oriental Books Reprint Corporation, 54, Rani Jhansi Road, New Delhi 110 055

6. Ali S M. (1973) *The Geography of the Puranas*, , F N I, Professor of Geography, University of Saugar, Second Edition 1973, People's Publishing House, New Delhi

7. Ali, Dr Shalwi (1995) *Yukti Kalpataru* (A critical study) by Dr Shalwi Ali, Head of Department, Sanskrit, Al Hafiz College, Arrah, Bhojpur, Bihar, Published by Preeti Prakasham, Bhojpur-802 309 Singahi Kalan, Arrah, 1st Edition 1995 in Hindi

8. Bhakti Vedanta Prabhupada Swami A C (1972) ***Bhagavad-gita* www.AsItIs.com**

9. Dagens, Bruno (1970) *Mayamata* Traite Sanskrit D'Architecture, Premier Partie, Ed Bruno Dagens, Published by Institut Francais d' Indologie, Pondicherry

10. Fass, Virginia (1986) *The Forts of India*, published by Rupa & Co, Calcutta, Allahabad, Bombay, Delhi in association with Oberoi Hotels International Ltd

11. Garstin J H (1878) *Manual of South Arcot* by J H Garstin, MCS, Collector, printed at the Lawrance Asylum Press by W H Moore

12. Ghosh, Goutam (2002) *Preserving heritage for posterity'* Article in *The Hindu*, Metro Plus dated 25-6-2002, Chennai THE HINDU, Newspaper, Chennai- 6000 02

13. Gopinatha Rao (1993) *Elements of Hindu Iconography*, Reprint of book published (1914) under the patronage of the Maharajah of *Travancore*, The Law Printing House, Mount Road, Madras, Republished by Motilal Banarsidass Publishers Pvt. Ltd, 41, UA, Bungalow Road, Jawahar Nagar, Delhi – 110007

14. Kannan, Dr , R (2000) *A Holistic Approach to Dating in Ancient History especially Indian history*, Published by Commissioner of Museums, Government Museum, Egmore, Chennai – 6000 08

15. Kannan, Dr., R (2003) *Monograph Rock Art* and *Cave Art*, New Series, General Section-Vol XVIII, No 1, 2003, Published by Commissioner of Agriculture, Archaeology and Museums, Department of Museums, Egmore, Chennai – 6000 08.

16. Kannan, Dr , R (2003) *Script of Son-et-lumière* (Sound and Light Show) of the *Rock Art* and *Cave Art* Gallery of the Government Museum, Chennai - R. Kannan , I A S , (F E 2002), Published by Commissioner of Agriculture, Archaeology and Museums, Department of Museums, Egmore, Chennai – 6000 08

17. Kannan, Dr., R (2003) *Tarangampadi (Tranquebar) Excavation and Conservation Report*, (Ed.) Dr R Kannan, IAS., Commissioner of Agriculture, Archaeology and Museums, and T. Subramaniam, Published by State Department of Archaeology, Taramani, Chennai – 600 113.

18. Kannan, Dr, R and Lakshminarayanan, K. (2001) Bulletin of The Chennai (Madras) Government Museum, '*Iconography of the Jain images in the Government Museum Chennai (Madras)*, New Series - General section - Vol XVI, No 1, 2001' - R Kannan, I.A.S., and K Lakshminarayanan (F E 2001), Published by Commissioner of Museums, Published by Commissioner of Museums, Department of Museums, Egmore, Chennai – 6000 08

19 Kannan, Dr, R and Lakshminarayanan, K. (2002) Bulletin of The Chennai (Madras) Government Museum "*Iconography of the Jain images in the Districts of Tamil Nadu (Covering the Museums of the Departments of Archaeology and Museums)*" - Dr R Kannan, Ph D , I A S , and K Lakshminarayanan (F E 2002) New Series - General section Vol XVII, No 1, 2002 Published by Commissioner of Archaeology and Museums Department of Museums, Egmore, Chennai – 6000 08

20 Kumar, Pushpendra (1998) Bhoja's *SAMARĀNGANA-SŪTRADHĀRA*, Vol I (Sanskrit Slokas), edited by Prof. Pushpendra Kumar, (with an elaborate English Introduction) first edition 1998, Published by New Bharatiya Book Corporation, 5574-A, Ch. Kashi Ram Market, Durga Complex, New Chandrawal, Delhi-110 007

21 Marshall, Sir John (1973) - *Conservation Manual*, A handbook for the use of Archaeological officers and others entrusted with the care of Ancient Monuments, First edition 1922, Published as reprint by Indological Book House, Varanasi and Delhi

22 www.monash.edu./mai/ Sacred Angkor.doc

23 Narayanan, R. (2003) *Conservation of Stone Monuments*, Dissertation submitted for the 29th Refresher Course on Care of Museum Objects, Government Museum, Chennai (unpublished)

24 Ramachandran, T.N. (2002) *Tiruparuttikunram and its Temples with Appendices on Jaina Units of Measurementand Time, Cosmology and Classification of Souls*. New Series – General Section Vol. I, Pt 3, First Edition 1934, Reprint 2002, Published by Government Museum, Chennai, Egmore, Chennai – 6000 08

25 Raman, Dr., K.V. (1986) *Principles and Methods of Archaeology*, Reprinted 1998, Published by Parthajan publications. 34, V Trust Cross Street, Mandaiveliipakkam, Chennai – 600 028

26 Rajasekhara Thangmani (Not known) *Pandiar Varalaru* (Tamil Textbook), Connemara Public Library, Published by Tamil Nadu Text Book Society

27. Shetty, Ashok Vardhan, K (2003) *Excavations at Mangudi*, (Ed.) A.V. Shetty, Published by State Department of Archaeology, Taramani, Chennai – 600 113

28 Shetty, Ashok Vardhan, K (2003) *Excavations at Perur* (Ed.) A.V. Shetty, Published by State Department of Archaeology, Taramani, Chennai – 600 113

29 Shukla, D.N. (1995) *Vāstu-Śāstra Vol I Hindu Science of Architecture*, 1995 edition, Munshiram Manoharlal Publishers Pvt. Ltd, 5715, 54, Rani Jhansi Road, New Delhi 110 055, Chapter II - Villages, Towns and Forts in General

30 Shukla, Dr., L.K. (1972) *The Chowkambha Sanskrit Studies*, Vol. LXXXII, A study of Hindu Art and Architecture with especial reference to Western Terminology, Published by The Chowkambha Sanskrit Series Office, K-37/99, Gopal Mandir Lane, P.O. Chowkambha, P.O. Box No. 8, Varanasi – 1, India.

31. Sivaramamurti C. (1976) *Amaravati Mode of Sculptures*, New Series, General Section, Vol. XI, No 1, Published by Director of Archaeology, Department of Museums, Egmore, Chennai – 6000 08.

32. Sivaramamurti, C. (1942) *Amaravati Sculptures in the Madras Government Museum* (F E 1942, L.R. 1998), Department of Museums, Egmore, Chennai – 6000 08.

33. Stapati, Ganapati, Dr. V. (1978) *Sirpa Sennūl*, in Tamil, Published by Department of Technical Education, Government of Tamil Nadu, Chennai- 6000 25.

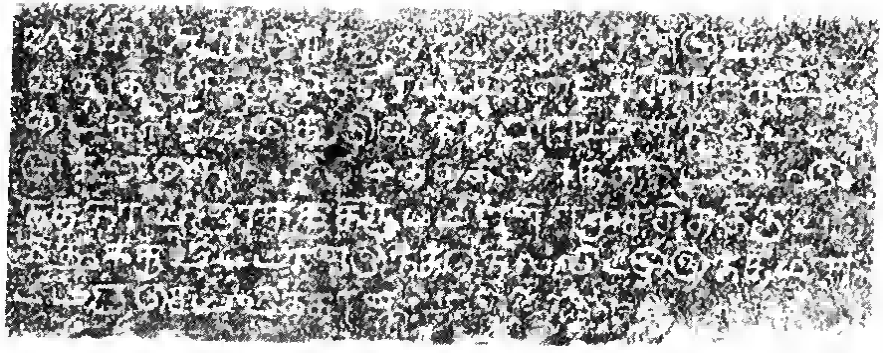
34. Stapati, Ganapati, Dr. V. (2001) *Building Architecture of Sthapatya Veda*, published by Dakshinaa Publishing House, Chennai – 600041.

35. Varma, Amrit (1985) *Forts of India* published by the Director, Publications Division, Ministry of Information and Broadcasting, Government of India, Patiala House, New Delhi-110 001.

36. Williams, Sir Monier – Monier (1961 - Reprint) *A Dictionary of English and Sanskrit*, Published by The Chowkambha Sanskrit Series Office, K-37/99, Gopal Mandir Lane, P O Chowkambha, P O Box No. 8, Varanasi – 1, India.

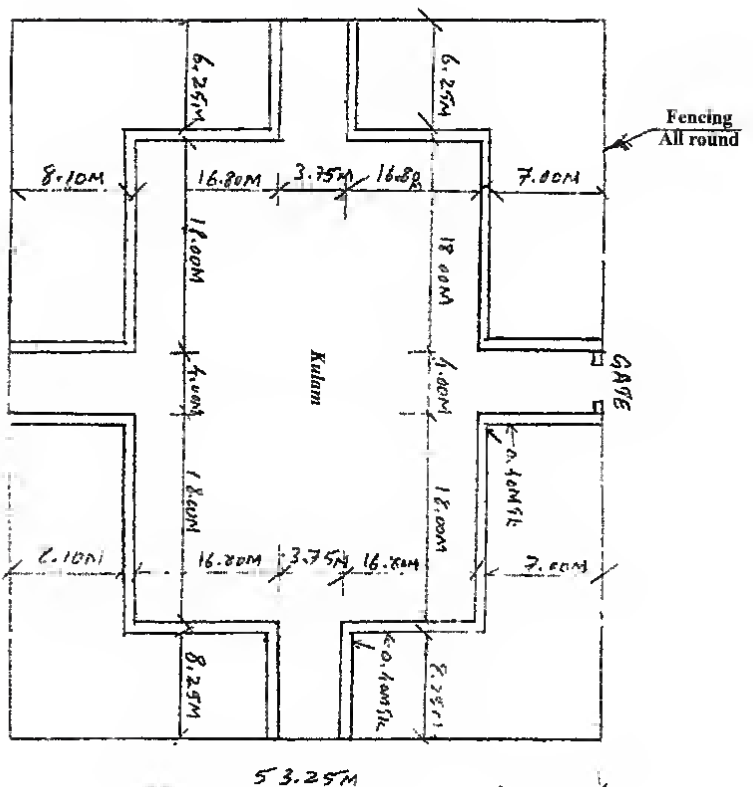
CHAPTER XV

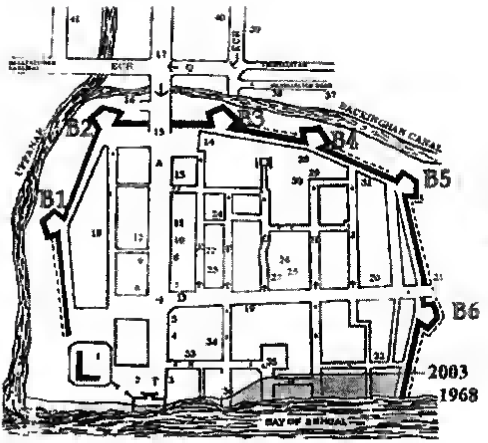
SITE MAPS AND PLANS OF THE STRUCTURES



Tiruparuttikuṉṟam Chandrapraba
Temple Kitchen (*madapalli* - in Tamil) South Wall
Inscription

Plan of *Chinnaiyankulam*





Explanation
of symbols used on the map of
Tranquebar
(Tarangampadi)

FORT WALL

DEMOLISHED FORT WALL

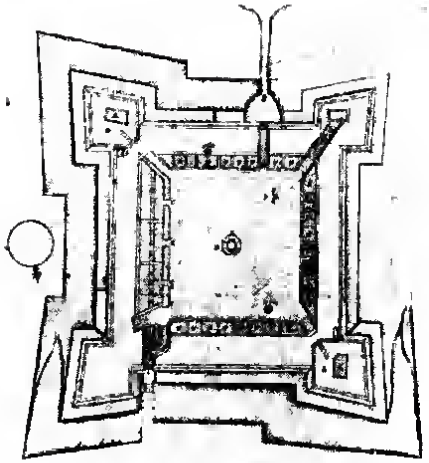
UPPANAR RIVER

NOW SWALLOWED BY SEA

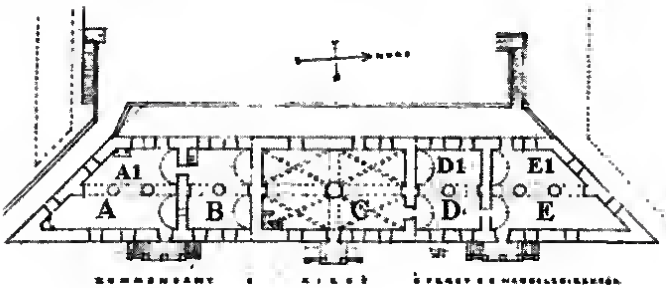
***Tarangampadi* Fort**

KING'S STREET "A"
1 OANS BORG FORT
2 ZIEGENBALG MONUMENT
3 COLLECTOR'S BUNGALOW
4 DANISH GOVERNOR'S BUNGALOW
5 T E L C TEACHER'S TRAINING INSTITUTE (SITE OF THE COMMANDANTS HOUSE)
6. CHURCH OF SWEDISH MISSION (C S.M. BUNGALOW)
7 ZION CHURCH
8 T E L C ZIEGENBALG SPIRITUAL CENTRE
9 NEW JERUSALAM CHURCH
10 ST THERESA'S TRAINING INSTITUTE
11 ST JOHN'S PRIMARY SCHOOL
12 ST THERASA'S CONVENT
13 GOVERNMENT HARIJAN GIRLS HOSTEL
14 ST.THERASA'S GIRLS HIGH SCHOOL
15 CITY GATE
16 LOCAL LIBRARY
17 MONUMENTAL ERECTION
CHETTY KADAI STREET "B"
NEW STREET "C"
18 ST THERESA'S DISPENSARY
QUEEN STREET "D"
19 INDIAN BANK
20 PLUTCHAV SCHOOL
21 SRI RENUGADEVI AMMAN TEMPLE
BORGAN STREET "E"
22. MARY'S GARDEN
(NOW RETIRED PASTORS QUARTER)
23 PASTERS TRAINING INSTITUTE
(NOW T E L C. GRUNDLER BOY'S HOSTEL)
PERUMAL KOIL STREET "F"
24 SRI PERUMAL TEMPLE
ADMIRAL STREET "G"
25 T E L.C HIGH SCHOOL
26 ZIEGENBALG HOUSE
27 PLACE OF FIRST PRINTING PRESS IN S INDIA
MOSQUE STREET "H"
28 OLD MOSQUE
29 NEW MOSQUE
30 DHURGHA
MARICAR STREET "I"
NAGHUDA STREET "J"
31 MUSLIM ELEMENTARY SCHOOL
GOLDSMITH STREET "K"
SRI ANGALAMMAN TEMPLE
32 SRI ANGALAMMAN TEMPLE
SALANGAIKARA STREET "M"
(NOW SWALLOWED BY SEA)
POST OFFICE STREET "N"
33 POST OFFICE
34 TOURIST INFORMATION CENTRE
35 SRI SIVAN TEMPLE
MASILLAMANI KOIL STREET "O"
36 SRI MASILLAMANI TEMPLE
MANIKA PANGU ROAD "P"
37 GOVERNMENT HOSPITAL
38 T E L C SHALUM SALAHAR KAIPAGAM
E C.R. MAIN ROAD "Q"
39 HOLY ROSARY CHURCH
40 ROZA WOMEN CENTER
41 TRANQUEBAR RAILWAY STATION

B1 PRINS JORGENS BASTION
B2 GYLDENLOVS BASTION
B3 DANMARKS BASTION (INTAKT)
B4 HORGES BASTION
B5 HOLJTENS BASTION
B6 LAALANDS BASTION



Old drawing of the fort and the fortification of Danshorg

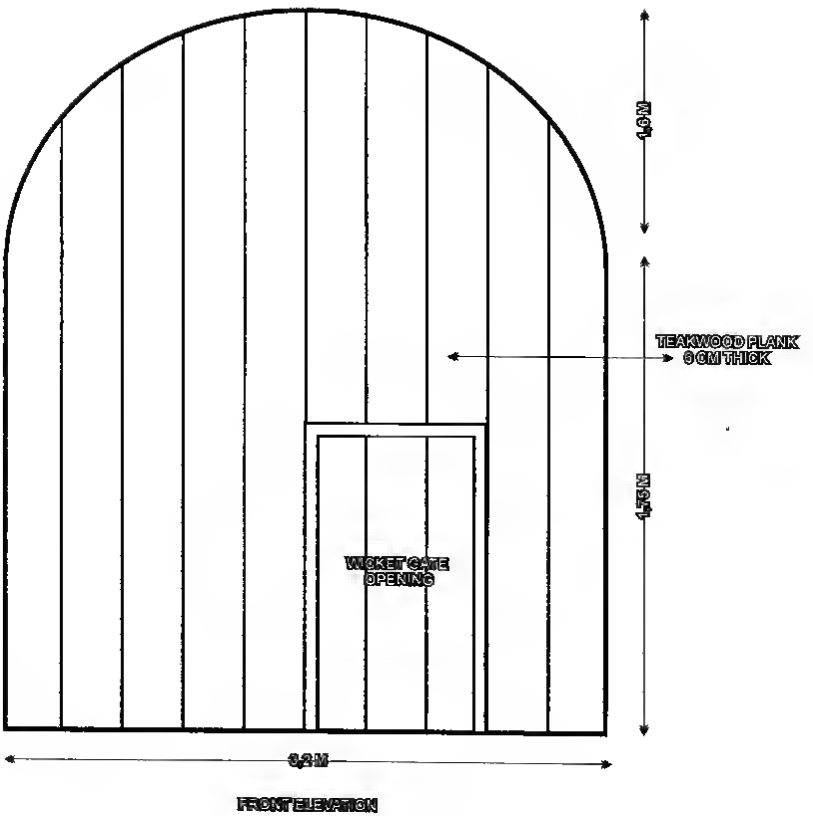


The plan for the fort Danshorg

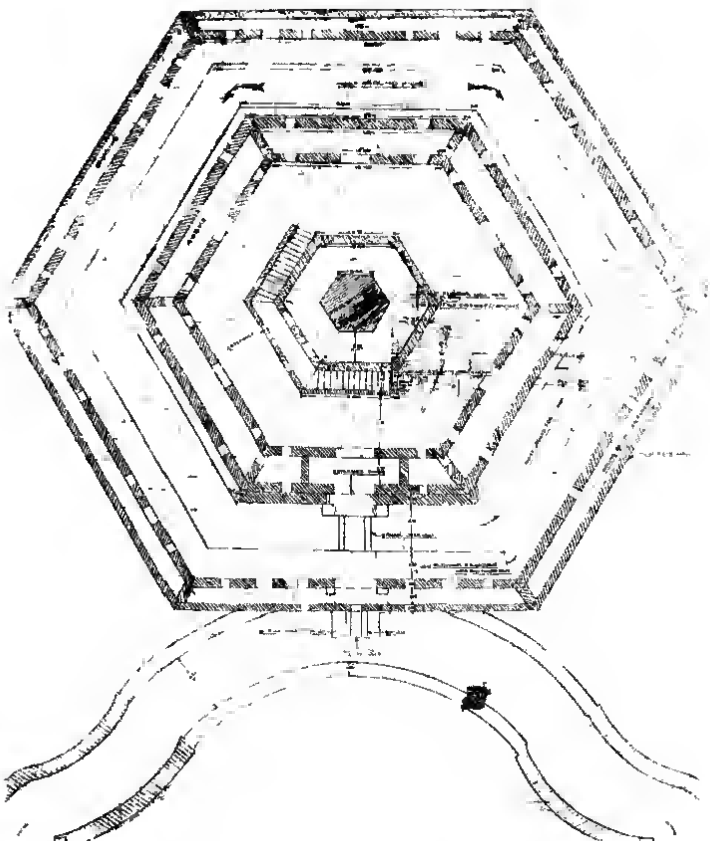
'Outer length of the building (facing the Bay of Bengal) is about 60 m
Outer length of the building (towards the drill ground) is about 45 m
Outer width of the building is about 11 m

A, A1 and B	The original governors residence (until 1784). These rooms were restored in 2002
A1	The kitchen in the governors residence with the open fire place and the funnel
C	The church room, now the museum
D and D1	The original rectory . (D is now the entrance to the museum and D1 is the store room)
E and E1	The original residence to the commercial director (E is now office to the museum and E1 is the store room)

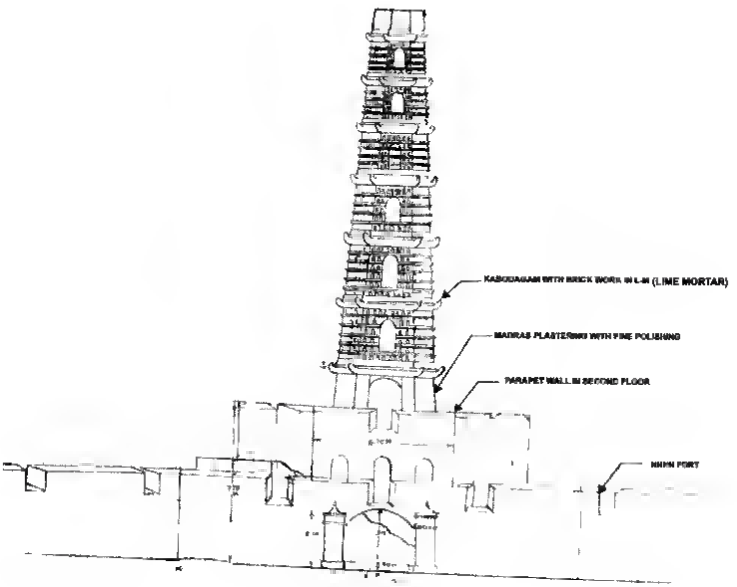
Plan of the proposed
Entrance Gate for the *Danish* Fort
at *Tranquebar*



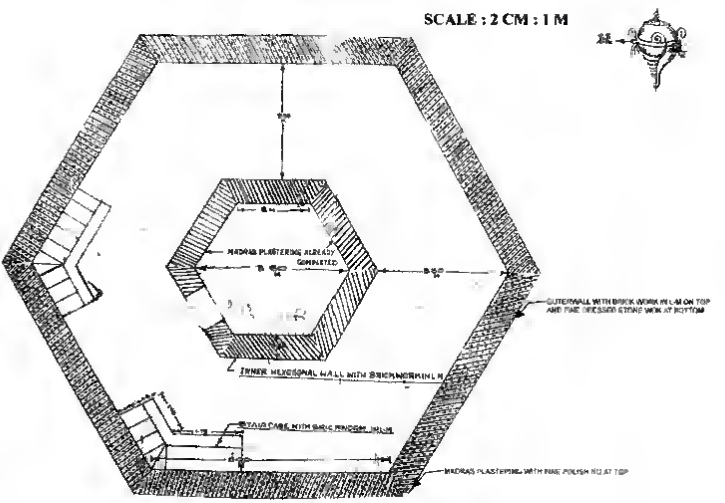
***Manora* Site Plan**
(Fortified Tower)



***Manora* Elevation**
(Fortified Tower)

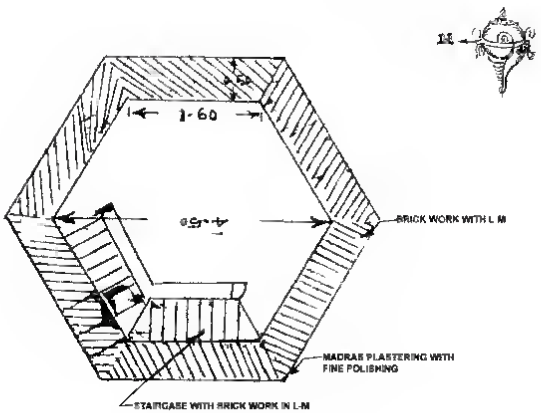

KADDADAIAM WITH BRICK WORK IN L-M (LIME MORTAR)
MADRAS PLASTERING WITH FINE POLISHING
PARAPET WALL IN SECOND FLOOR
MAIN PORT
ENTRANCE

Plan showing the I floor of *Manora* Fort
(Fortified Tower)



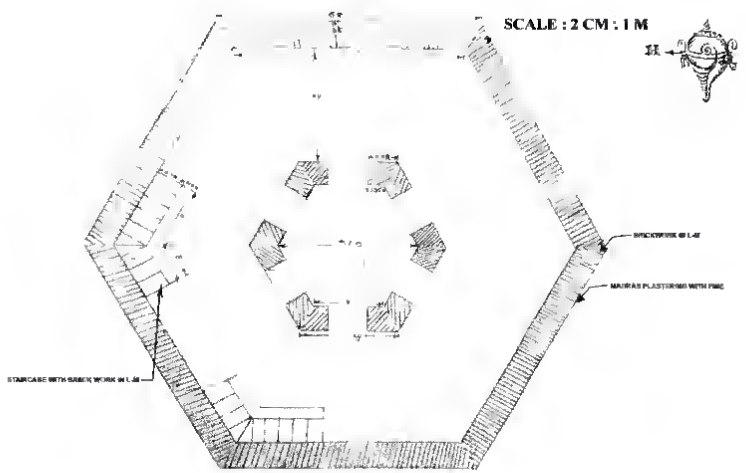
Plan showing the III floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M



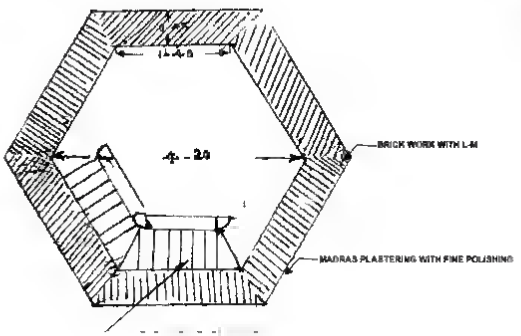
Plan showing the II floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M



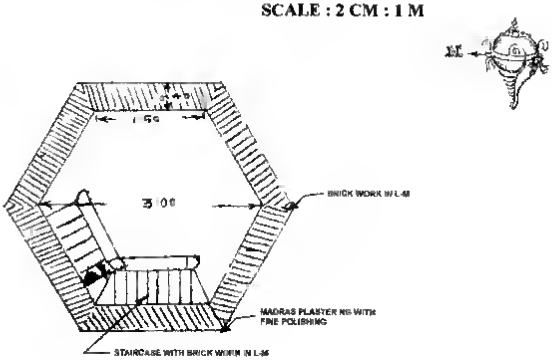
Plan showing the V floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M



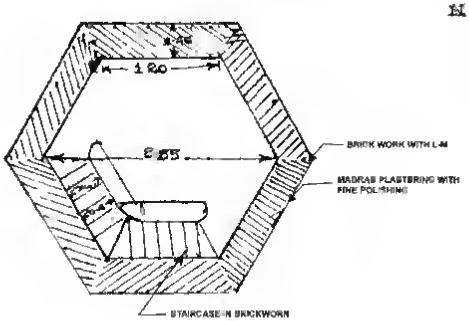
Plan showing the IV floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M



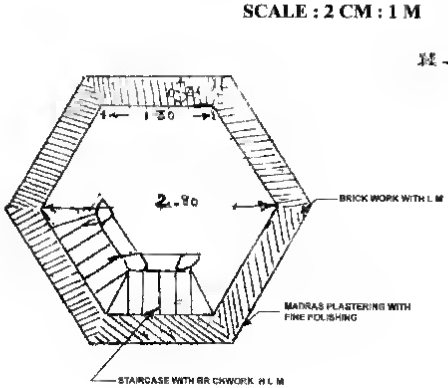
Plan showing the VII floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M



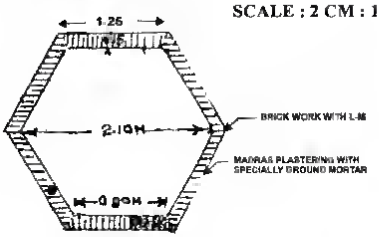
Plan showing the VI floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M



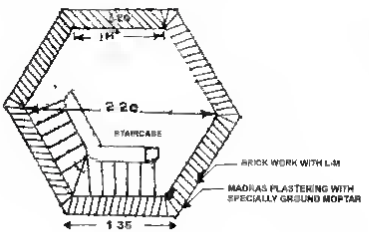
Plan showing the IX floor of *Manora* Fort
(Fortified Tower)

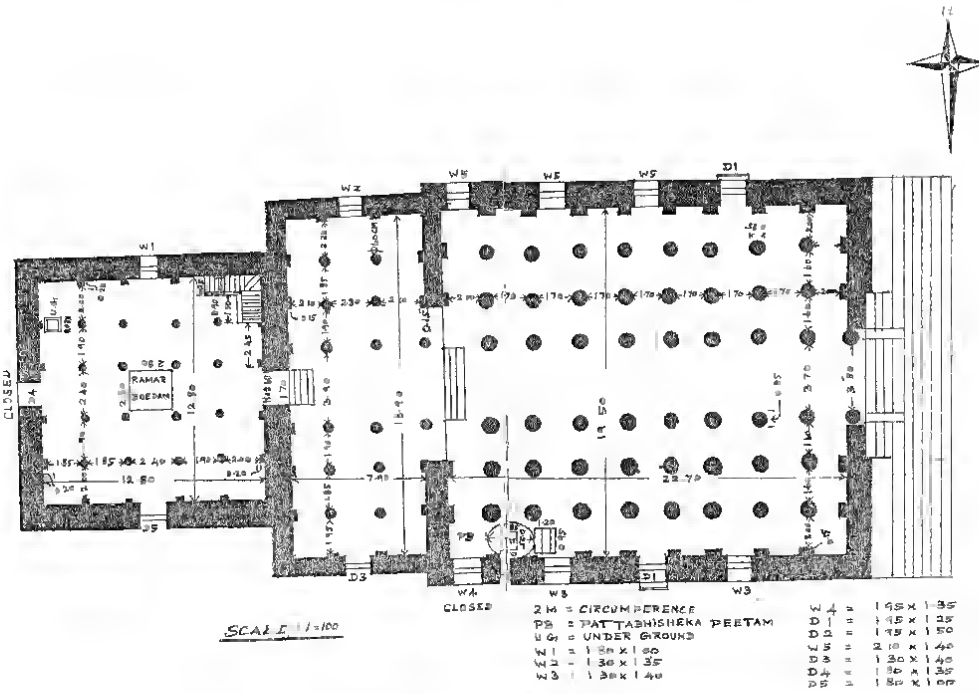
SCALE : 2 CM : 1 M



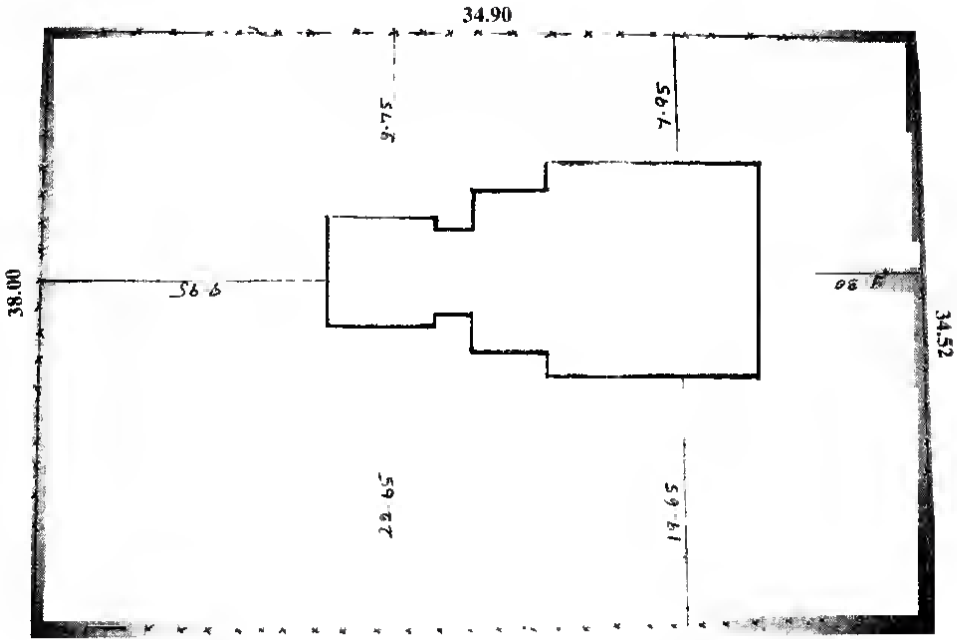
Plan showing the VIII floor of *Manora* Fort
(Fortified Tower)

SCALE : 2 CM : 1 M





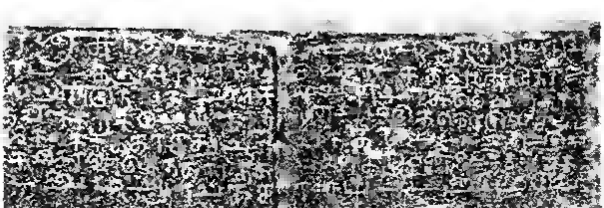
***Ramalinga Vilasam* Site Plan**



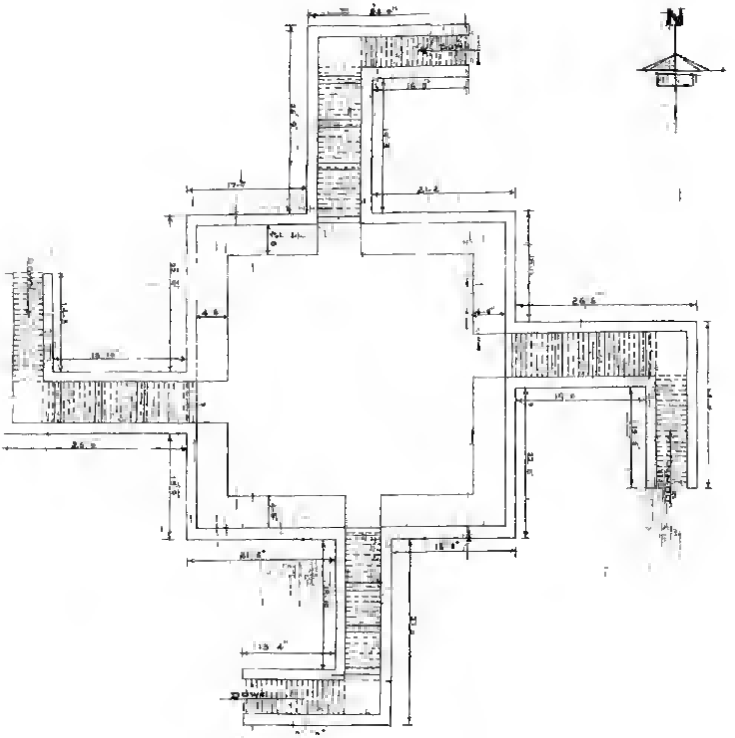
***Sivan koil Sivapuram* Site Plan**

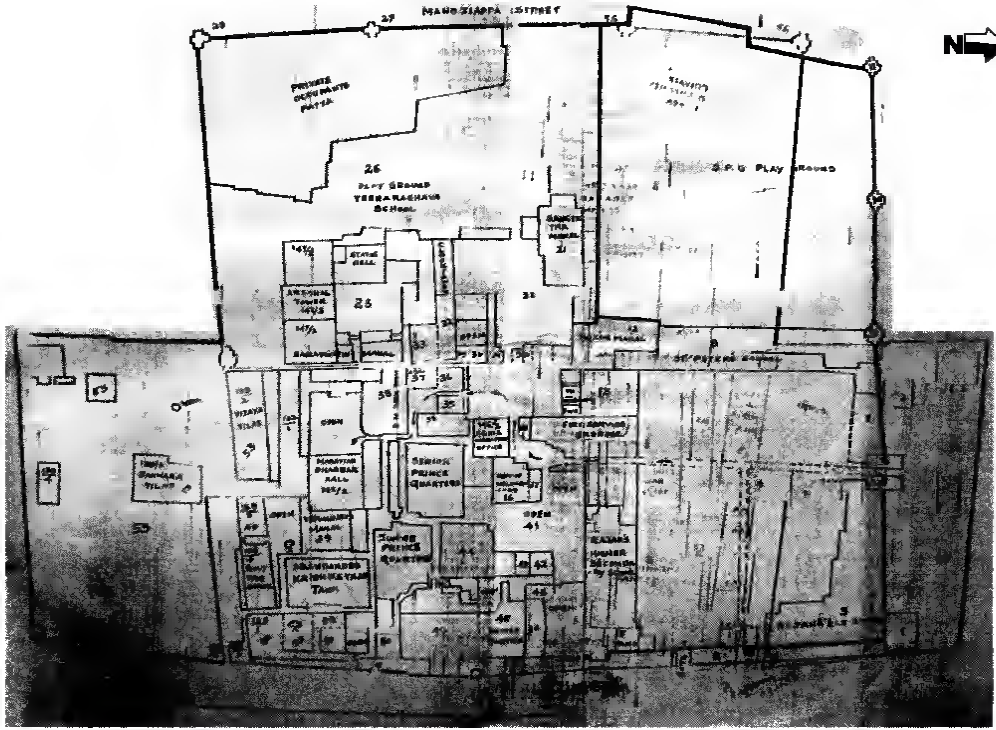
Arthamandapam **South Wall Inscription**
Sivapuram
(Sivan koil)

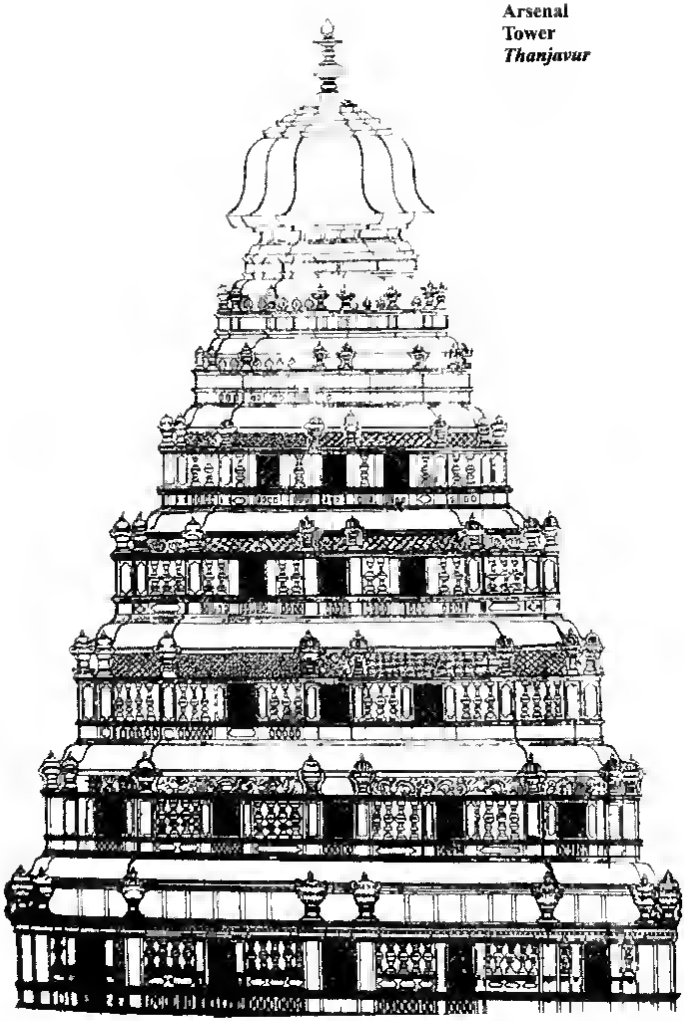
Arthamandapam **Inscription**
Sivapuram



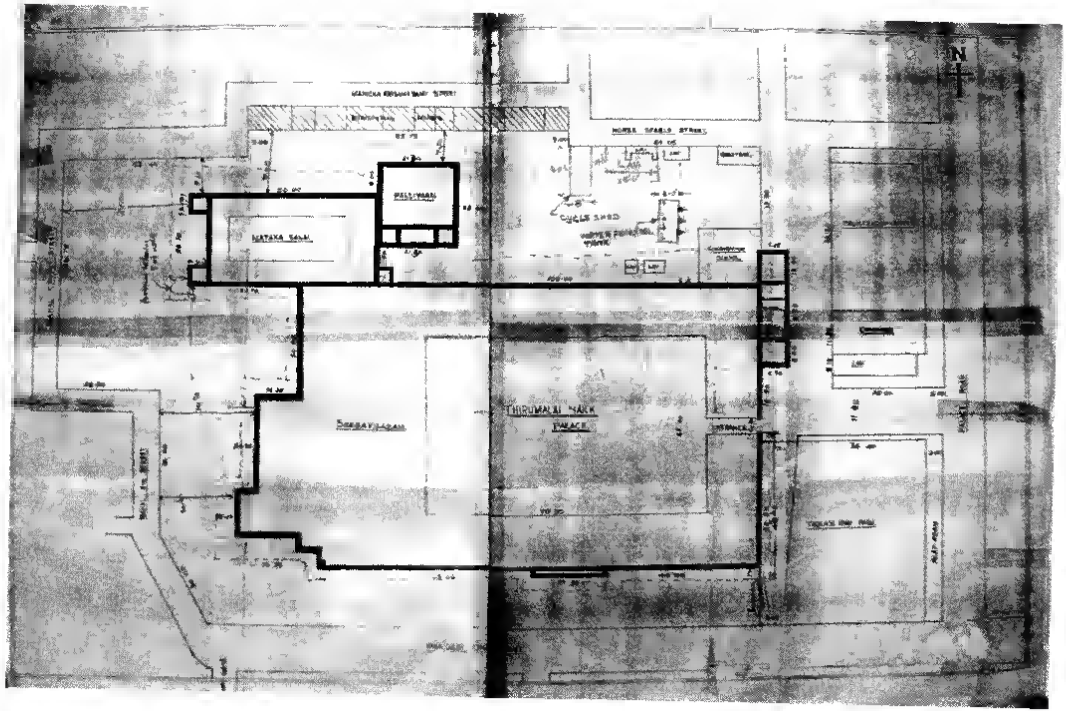
***Swastik* Well Site Plan**



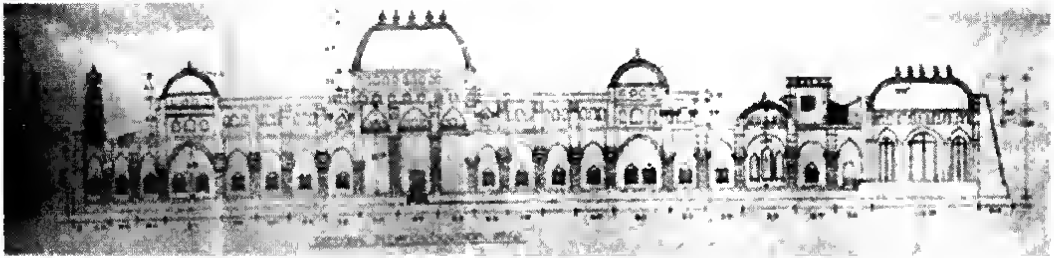

N
MAHADJANAPA STREET
PRIVATE QUARTERS PALACE
26
PLAY GROUND
TESSARACHAR SCHOOL
25
P.W.D PLAY GROUND
ARSENAL TOWER
STONE WELL
RAMPART
SARASWATHI MAHAL
SARASWATHI MAHAL LIBRARY
SARASWATHI MAHAL
SARASWATHI MAHAL
SARASWATHI MAHAL

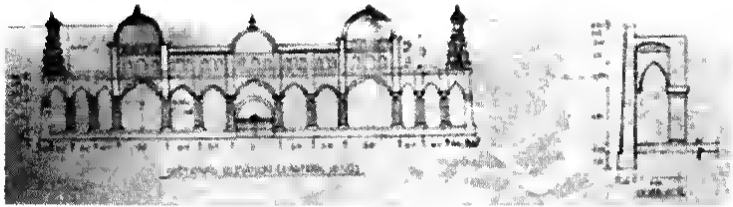


Arsenal Tower
Thanjavur

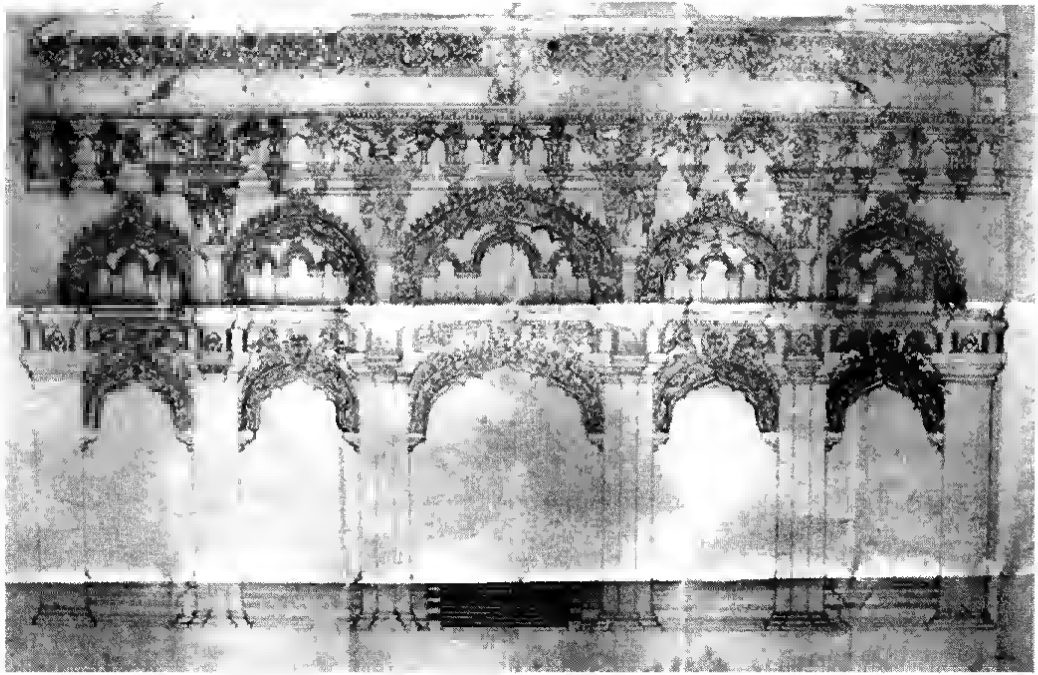


***Tirumalai Naik Mahal* site plan**



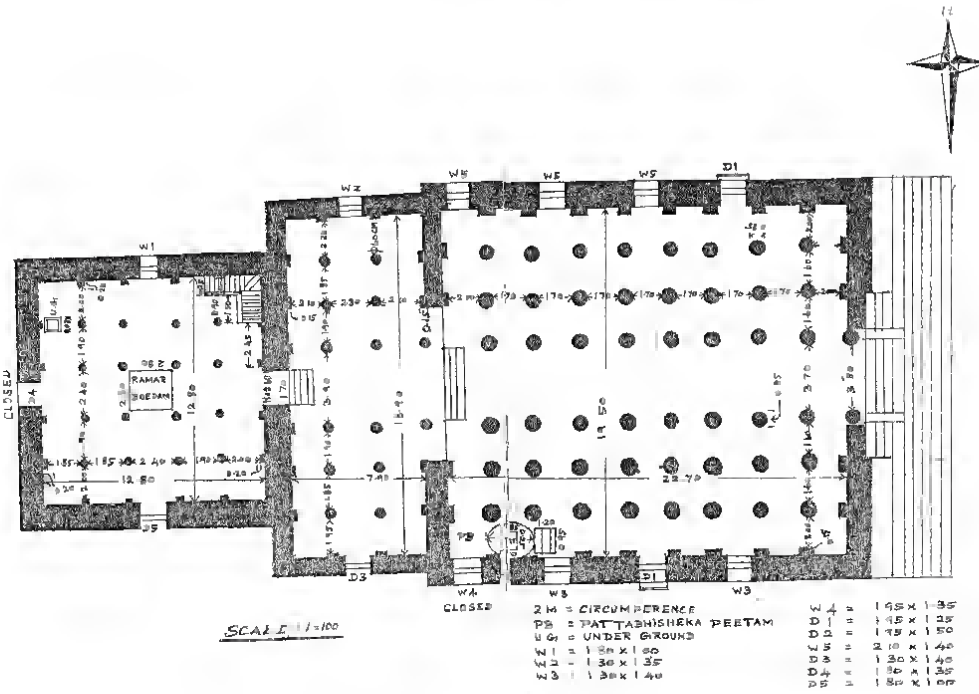


Tirumalai Naik Mahal - **Front Elevation**

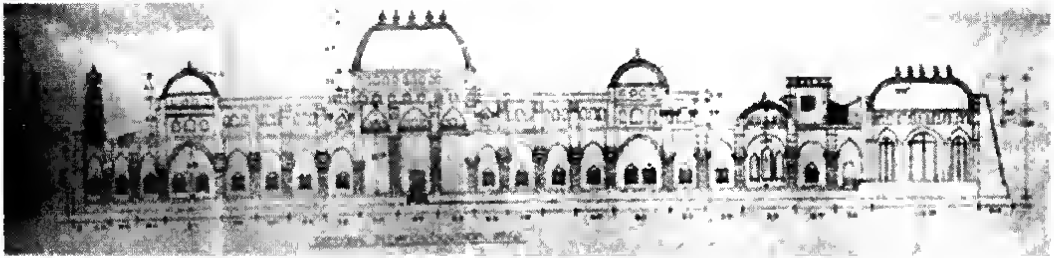


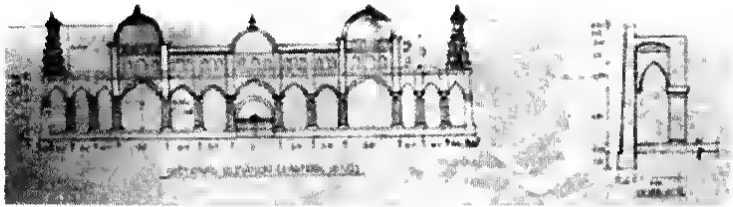
Tirumalai Naik Mahal - Inner Elevation

Tirumalai Naik Mahal - **Inner courtyard**

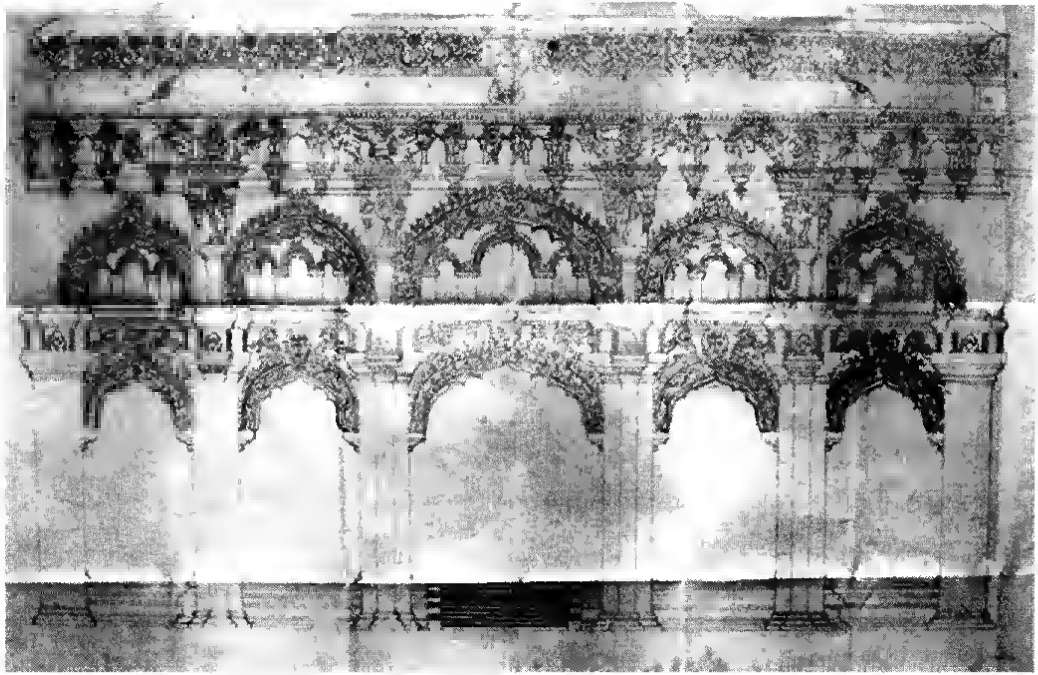


***Ramalinga Vilasam* Site Plan**

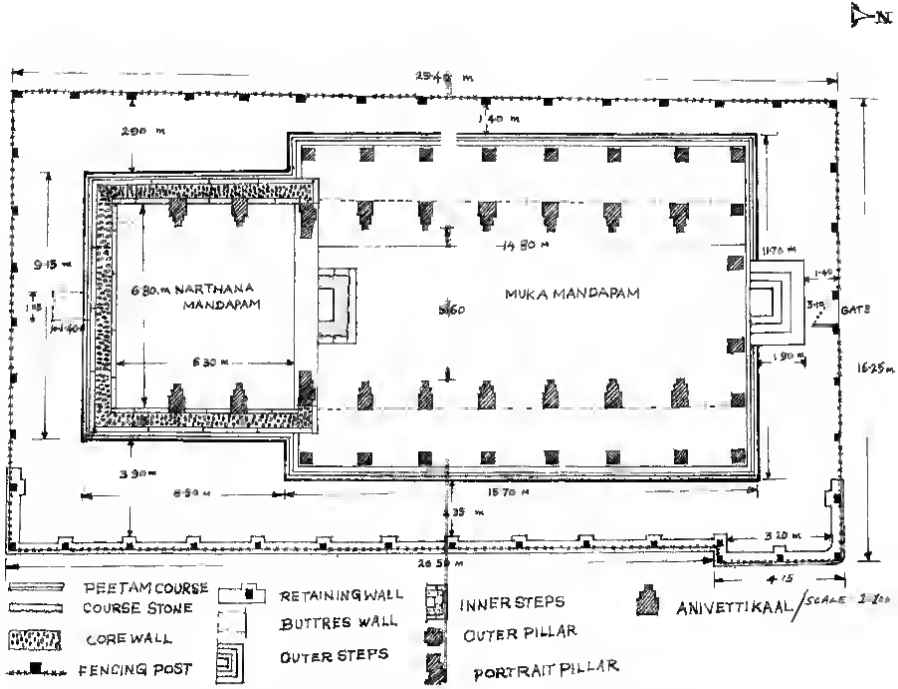




Tirumalai Naik Mahal - **Front Elevation**

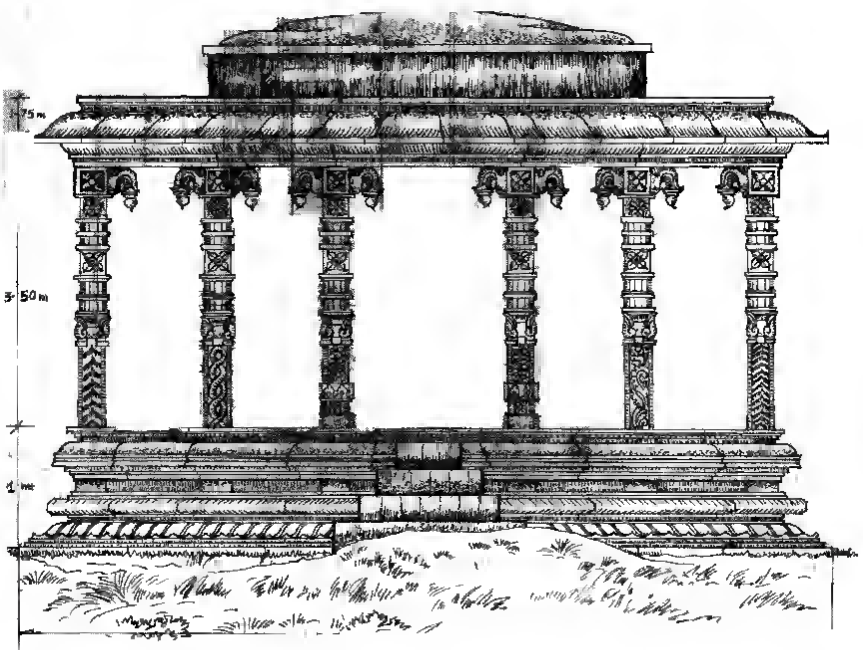


Tirumalai Naik Mahal - Inner Elevation

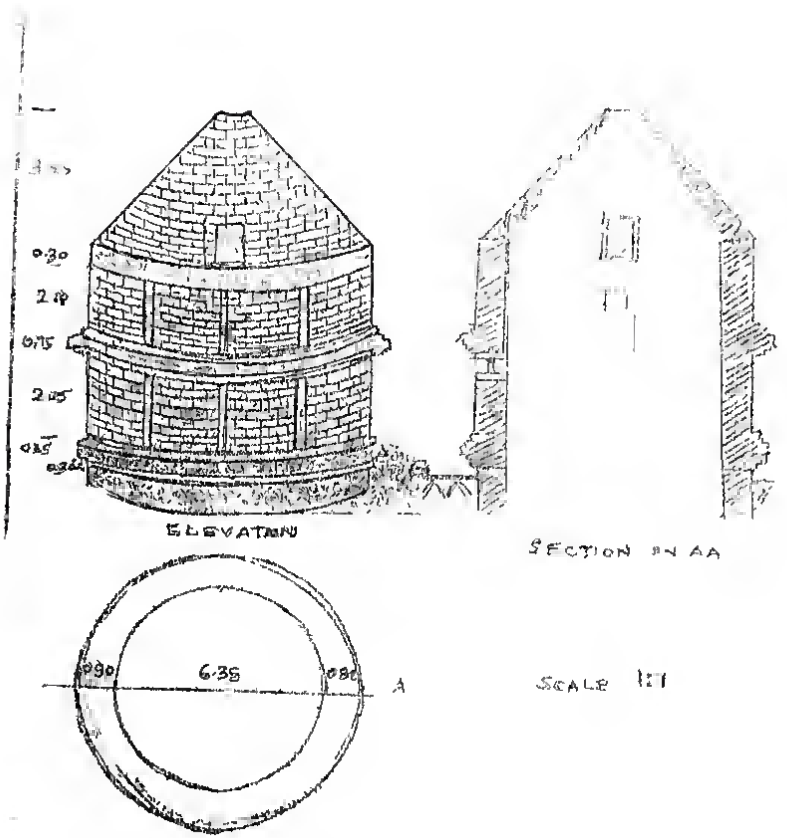


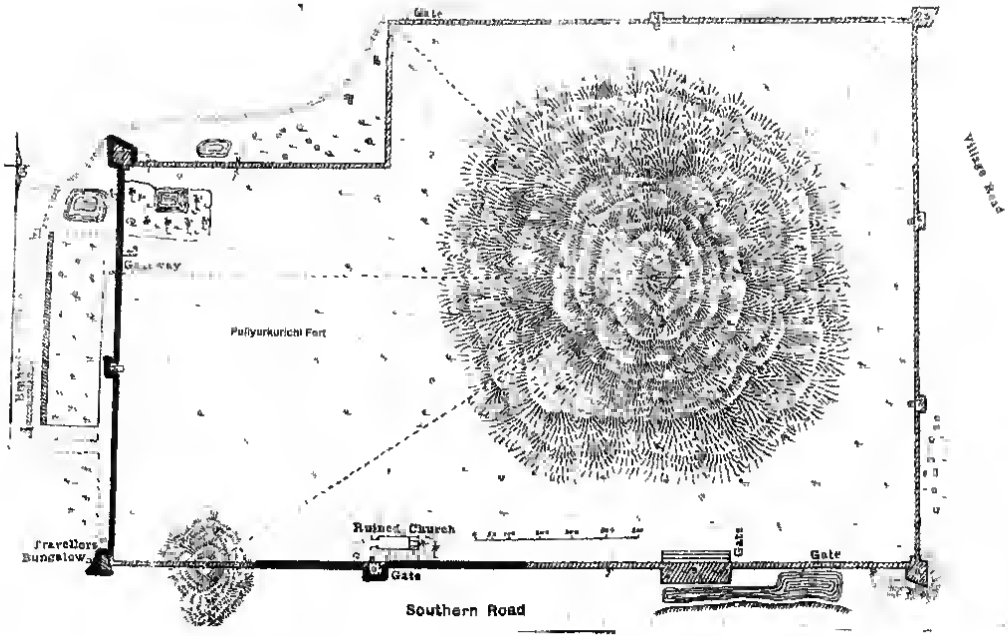
***Tirumalai Naik (Naicker) Mandapam (Alagarkoil)* Site Plan**

Tirumalai Naik (Naicker) Mandapam - Alagarkoil, Madurai
Front Elevation

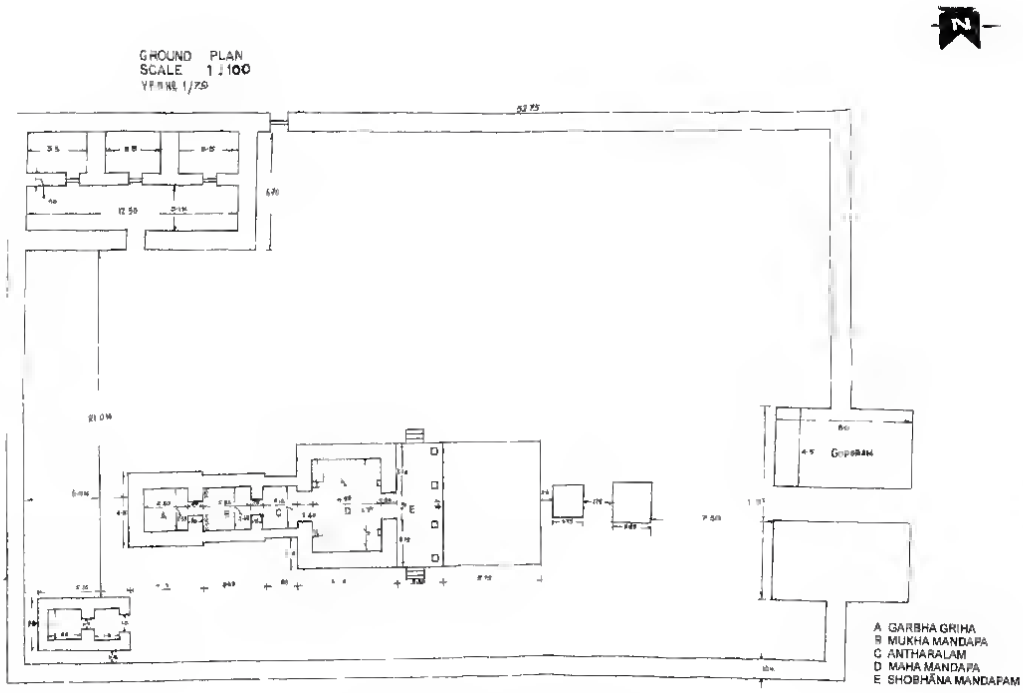


Plan of Granary at *Tirupalaithurai*



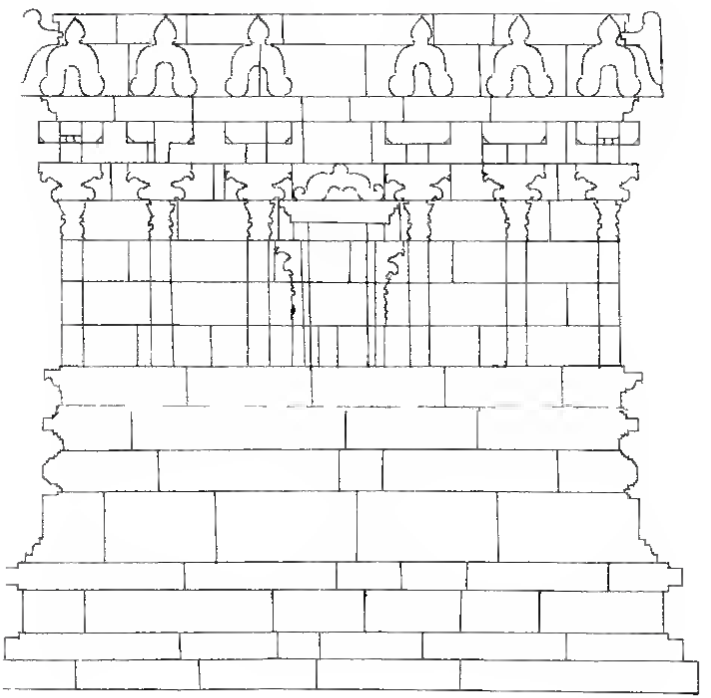


***Udayagiri* Fort Site Plan**

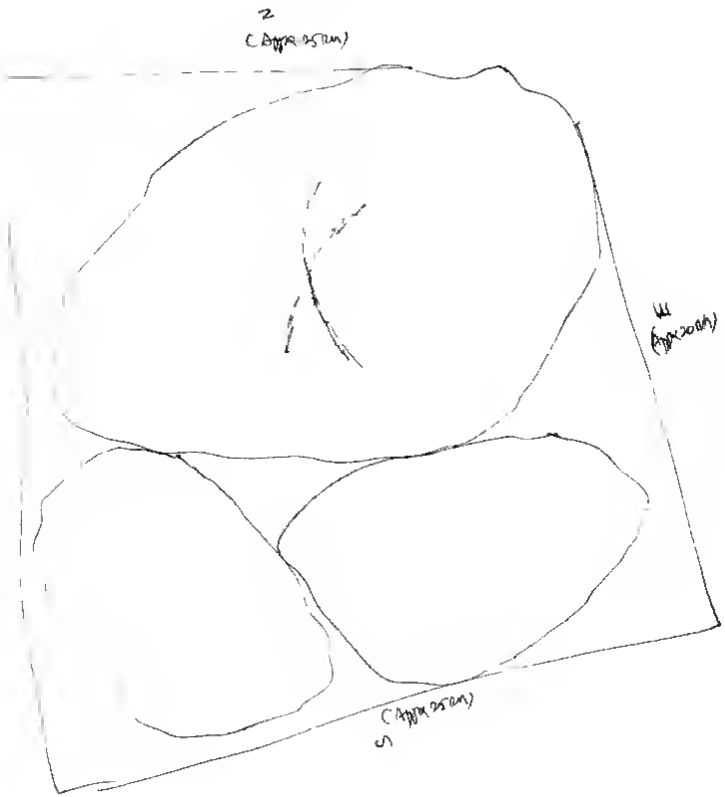


***Vittala* Temple (*Vitalapuram*) Ground Plan**

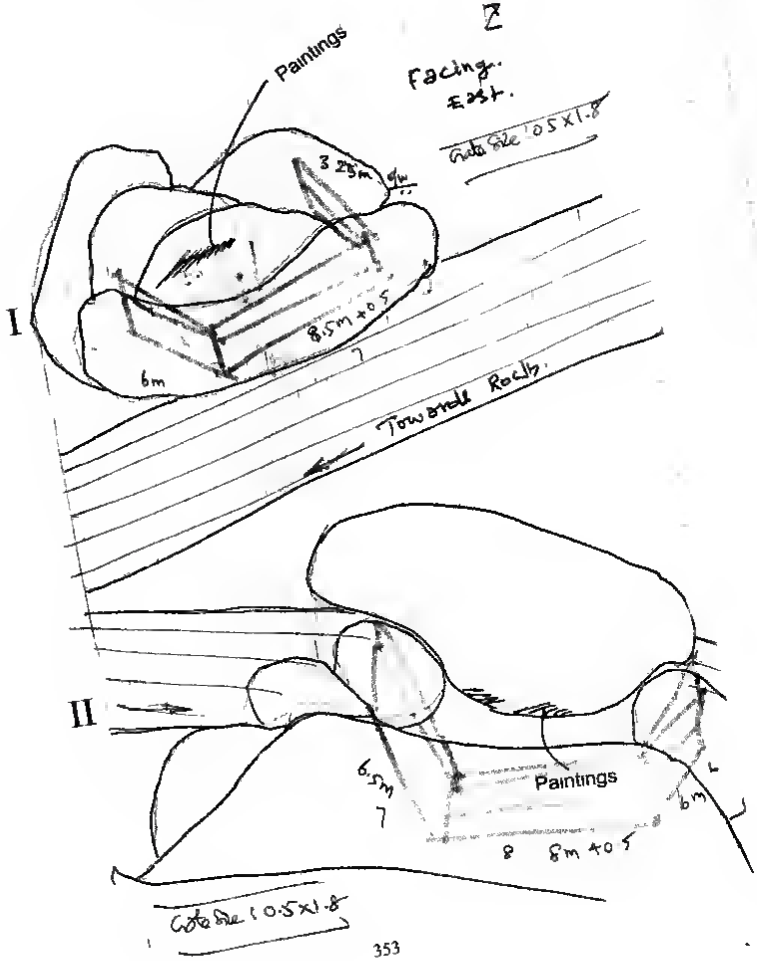
***Vittala* Temple West Elevation**



***Ālambādi* Rock Art Plan**



Kīlvālai Site Plan



MAP SHOWING THE CONSERVED MONUMENT SITES IN THE DISTRICTS INCLUDED IN THE TEXT

1 Chandraprabha Jain Temple – *Kanchipuram* District, *Kanchipuram* Taluk *2 Vardhamana* Jain Temple (*Trailokyanatha*) – *Kanchipuram* District, *Kanchipuram* Taluk *3. Siva* Temple *Sivapuram Kanchipuram* District, *Thiruvelumpudhur* Taluk, *4 Vittala* Temple *Vittalapuram Kanchipuram* District, *Chegalpattu* Taluk, *5 Chinnaiyan Kulam* — *Tiruvannamalai* District *Chengam* Taluk, *6 Dansborg* Fort — *Tranquebar Nagapattinam* District *Mayiladuthurai* Taluk *7 Manora* Tower *Thanjavur* District *Pattukottai* Taluk *8 Thanjavur* Palace *Thanjavur* District *Thanjavur* Taluk *9 Tirupalaithurai* Giant Granary – *Thanjavur* District *Papanasam* Taluk, *10 Ramalinga Vilasam* – *Ramanathapuram* District *Ramanathapuram* Taluk *11 Rajakkal Mangalam Tirunelveli* District, *Nanguneri* Taluk *12. Tirumalai Nayk Mahal* (Palace) – *Madurai* District, *Madurai* Taluk, *13 Tirumalai Nayk Mandapam* – *Madurai* District *(Alagarkoil) Melur* Taluk, *14 De-Lanoy's* Tomb at *Udayagiri* Fort *Kanyakumari* District *Kalkulam* Taluk *15. Vettuvankoil* Thuttukudi *District, Kavilpatti Taluk 16. Swasthi* Tank – *Tiruvallarai Tiruchirapalli* District *Lalgudi* Taluk. *17. Alambadi* | *Villupuram Tirukovilur* Taluk. *18. Melvalai* | *Villupuram Tirukovilur* Taluk *19 Perumukkal- Villupuram, Tindivanam* Taluk 20 *Settavarai Villupuram Gingee* Taluk

About the Author

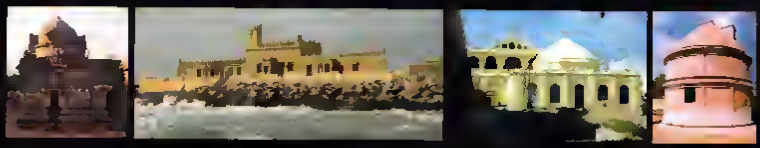
Dr R. Kannan, B.Com., B.L., M.B.A., C.A.I.I.B., M. Soc. Sci (Birmingham, U.K.), M.A. (History), Ph.D., I.A.S. belongs to the 1981 batch of the Indian Administrative Service. He worked as a Probationary Officer in the Bank of Baroda and the State Bank of India for four years before joining the I.A.S.

Dr Kannan is an expert specialised in Participatory Rural Appraisal. As a district administrator (Collector of Erode) in 1991-93 he pioneered the use of PRA in government. His Ph.D. thesis is on "Impact Appraisal of the use of PRA in government run programmes". He continues to practice and teach Participatory Learning and Management, Appreciative Inquiry (US Version of PRA) in his jobs in diverse departments ranging from public sector industrial units, agriculture, archaeology and museums department and the cooperative department which he headed. He also sometimes teaches as a labour of love PRA for Post Graduate students.

Dr Kannan is internationally known as an expert in Archaeology and Museums and has written more than 32 books and many more articles on the subjects. He was Commissioner of Archaeology (two terms) and conserved several ancient monuments and temples as a pioneering effort in 2001-2002 and 2003, when he was put in merged charge and additional charge of that department respectively. He was Commissioner of Museums from 1999 to 2004.

During his tenure of office as Commissioner of Agriculture in 2002-03 and as Agricultural Production Commissioner in 2003-2004, he did commendable work in the field of agriculture. New policy initiatives, methods of drought management and their implementation with clear decisions taken dispassionately in the manner of the ICS administrators of yester years were his hallmark. He has written several books on Agriculture and Cooperation.

The author, Dr R. Kannan has held several important positions in various capacities in the Indian Administrative Service and Registrar of Cooperative Societies (2004-2006). He has written two books on Cooperation *'Centenary of the Cooperative Movement in Tamil Nadu with special reference to the year 2004-05'* and *'Menegement of Cooperatives in Tamil Nadu with special reference to the year 2005-2006'*. He identified critical and strategic areas of cooperative reforms, revitalisation efforts in various sectors like credit, consumer, marketing, etc. with focus on cooperative principles, policies, performance and impact to help develop future strategies for holistic and integrated development of cooperatives.

Dr R. Kannan is an epitome of a rare combination of administrative and academic excellence, a prolific writer, voracious reader and an eminent thinker.

This is his second tenure from 14-6-2006 as Special Commissioner and Commissioner of Museums. In this tenure, he has authored a research publication 'Unravelling The Mystery Behind The Diagram In The Form Of *Chakras* (Sacred Circles) In Mehrangarh Fort, Jodhpur', on a two hundred year old manuscript. He has written other articles also. In this publication, *'Manual on Conservation and Restoration of Monuments - The Procaedings of an Administrator turned Conservation Archeeologist cum Museologist'*, he has analysed more than 25 monuments besides the heritage buildings in the Government Museum, Chennai. He was the first person to start conservation of monuments as Commissioner of Archaeology in 2002, forty one years after the department was started in 1961. He has also conserved and reorganised galleries in the Government Museum, Chennai on a massive scale for the 151st year celebrations. In this tenure also, he has been active as usual. The experiences of conservation are analysed and condensed in this book. This makes it a book of theory and practice of conservation and restoration. He has also touched on other topical issues like out reach activities, sand blasting, use of power tools, reorganisation and conservation of artefacts like the Amaravati artefacts and gallery. This book should be useful to all those involved in the conservation movement of our ancient heritage, academicians, architects, engineers, archaeologists, museologists, students and historians of the future.